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RESIDENTIAL AIR CONDITIONING . WARM AIR HEATING . SHEET METAL CONTRACTING



HEATED BY THE SUN

This unusual house in Dover, Massachusetts collects and stores the sun's energy. The vertical black sections collect the sun's heat and circulating warm air conducts it to storage bins, where it is available for use as required. Page 89.

- Cost accounting is the important topic discussed by author Roberts in his bookkeeping series this month. Page 72.
- "Heating Basementless Houses With Warm Air" is the title of a new, up-to-the-minute series by Professor Konzo, starting on Page 83.
- Remodeling a cathedral in Cleveland furnished enough material for two stories in this issue. The sheet metal work is described by one author and the air conditioning by another. Begin on Page 99.



installation is just as easy as the figuring.

This great new common-sense forced-air system requires only 4 types of duct fittings . . . needs no increasers or reducers on the streamlined main trunk, which adds up to savings of 30% in material and 25% in labor.

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Type 672 is designed for service on intermittent ignition burners.

PENN SAFTROLS

Automatic instantaneous shutdown of the oil burner if line voltage drops below safe limits is an extra protection exclusively available in Penn oil burner stack switches. Experienced service men will appreciate this extra safety factor. This feature eliminates the possible hazard of continued oil delivery into a warm combustion chamber when ignition has been interrupted by an excessive drop in line voltage.

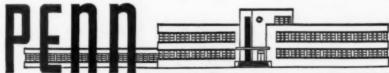
Penn Saftrols are designed to stop all burner functions when voltage drops to approximately 70, during operation. The relay will pull in only when voltage is 90 or higher. Both types—continuous and intermittent ignition—lock out under sustained low voltage conditions... they automatically recycle on voltage interruption.

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You, too, will find Penn Heat Anticipation the answer to your customers' demand for real heating comfort. Automatic night set-back of temperature is provided by Tem-Clock, a dependable electric timepiece which may be installed in any room, regardless of thermostat location. Standardize on Penn dependable heating controls. Penn Electric Switch Co., Goshen, Ind. Export Division: 13 E. 40th St., New York. In Canada: Penn Controls Ltd., Toronto, Ont.





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RESIDENTIAL AIR CONDITIONING

WARM AIR HEATING

SHEET METAL CONTRACTING

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

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Founded 1880

AUGUST, 1949

Volume 118, No. 8

AMERICAN ARTISAN, AUGUST, 1949

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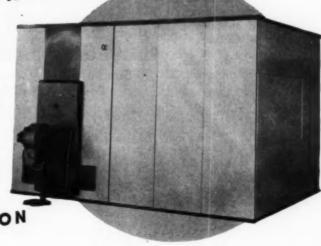


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FULL DETAILS AND INFORMATION WRITE OR CALL



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WATERTOWN, WISCONSIN



This Month

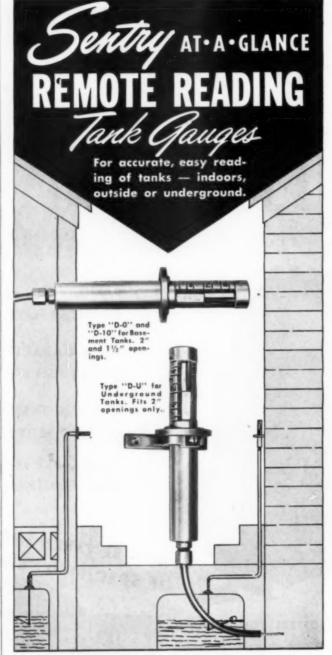
In the RESIDENTIAL AIR CONDITIONING SECTION this month, Professor S. Konzo starts a series on heating basementless houses. A suggested procedure for design of a perimeter system applied to a slab floor will be outlined from data assembled from a number of sources. Since data available from research is meager, the design procedure will include safety factors so it may be used in the interim until future research and experience suggest revision.

The first installment discusses the construction and design of the basement itself. If basements have come into disfavor among some architects, builders, and home owners, much of this opposition can be attributed to their design in the past because it is generally admitted that basements provide economical space. Professor Konzo tells how they can be made more livable and he does so from experience because the basement of Research Residence No. 2 incorporates most of the design features he discusses.

Wide interest in the series is anticipated and reprints will be available.

Hugh B. Reid, widely-known in sheet metal circles as an author and instructor, this month presents in the SHEET METAL SECTION his first simplified pattern development to AMERICAN ARTISAN readers. We asked Mr. Reid to send us a thumb-nail sketch of his background which we print in his own words:

I was introduced to the sheet metal trade in 1918, when, on leaving school, I entered a five-year apprentice-



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Long wanted — long needed. Sentry now brings you remote reading gauges that accurately indicate correct liquid level at all times. Accuracy not affected by changes or variations of specific gravity of oil. Can be installed with or without additional gauge on tank for dual location reading. No unnecessary fittings, bulbs or levers for oil man to tamper with . . no need for access to building. Stainless steel and brass

access to building. Stainless steel and brass extension lines—cast aluminum, weatherproof thermometer type indicator, calibrated in fractions. Easy to read — unconditionally guaranteed. Write for descriptive folder showing complete line.

KRUEGER Sentry GAUGES



ship with one of the large shipbuilding and engineering yards on the banks of the River Clyde in Scotland. Coordinated with this sheet metal training was a related course of instruction, including sheet metal pattern drafting. I developed a particular liking for the latter and adopted it as a hobby.

At the conclusion of my apprenticeship, I decided to leave Scotland, and in 1923, I found myself in Detroit, Michigan. I readily obtained employment in the sheet metal field, and it soon became apparent to me that this country's methods were different. The field was wider and much more varied. So back I went to school, and interest continued through a four year college course which terminated with a B.Sc. degree.

The layout hobby took me into part-time work at the Ford Apprentice School, the Wilbur Wright Evening School, and the University of Michigan Extension Service. In 1941, a Navy service school was opened in Dearborn, Michigan, and it was my privilege to be assigned to the faculty as a drafting instructor, teaching the metalsmith and shipfitter rates. The Navy decommissioned the training school in 1944, and I accepted a position in the engineering department of one of the large industrial plants in Detroit, continuing teaching part time at the University of Michigan and the Wilbur Wright Evening School.

Throughout the years I made a collection of interesting and practical problems, worked out in the simplest way by the most time-saving methods. This work was published in 1943 under the title

Why I like my

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Dealers everywhere are acclaiming the '49 VICTOR line as the fastest-selling furnace line they have ever handled. Its many exclusive features, including the patented heat radiating FINS, take you right out of the competitive class. The '49 VICTOR line is complete. 17 coal, gas and oil models in all sizes enable you to compete successfully for any size job and increased plant capacity assures your getting your VICTORS when you want them.

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Simplified Methods in Sheet Metal Layout.

In the series of articles that will appear in AMERICAN ARTISAN, simplified methods of solution will be presented. Comments and criticism from readers will be appreciated.

Crawl Spaces

Ralph R. Britton's discussion "Crawl Spaces— Their Effect on Dwellings" (AMERICAN ARTISAN, May 1949) is very interesting and very common. I would like to learn his recommendations for the conditions outlined and also what he means by "properly treated" ground surface in the crawl space.

L. E. STAHLER Aurora, Ill.

The first installment did not clearly indicate that another would follow. The second installment in the June issue contained the author's recommendations for overcoming excessive moisture in crawl spaces.—ED.

Contractor in the Making

I am enclosing a snapshot of our younger son Michael, age 1½ years, who seems to enjoy AMERICAN ARTISAN almost as much as his father.



The picture was not posed. He simply picked up the magazine himself and sat down to look it over.

. Mrs. Robert J. Crathers Ishpeming, Mich.



OIL or GAS BURNING FURNACES

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NEW UNITS — NEW DESIGNS BETTER THAN EVER!

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Incorporated in 1928



We can tell from what Michael is reading and by his expression that he is talking "shop" with his father. It's probably about a new bookkeeping system, or that heat pump installation in Seattle, or how to re-arrange the shop. Anyway, it's in the May issue and Michael is telling him all about it.

Welcome to the Notebook, Michael, and thanks, Mrs. Crathers.—ED.

This Reader Suggests . . .

What is the value of your publication to your readers? To make them better informed about their business.

How can such reading be turned into reliable learning? By having any article quickly and fully available for review when needed for a practical problem.

What then is good procedure in making the best use of articles on various subjects? A good way is this. The busy subscriber, upon receiving the publication in the mail, peruses it casually and notes the numbers of pages of especial interest on the front cover. These will mainly be articles as . . . in the June issue, "Crawl Spaces," "Custom Made Evaporative Cooling Systems . . .", etc. These he will read as far as possible at the time and also make notes in his private engineering data book. Then he will cut out of the publication the articles of interest to him . . . and put them into special files.

It is then that he realizes that the editor has sabotaged the best efforts of the authors.

The text of an article is interspersed with little items





like a tabloid. Worse, another article starts before one is finished . . . limiting the reader to only one article he may cut out, often a difficult choice.

How much better it would be if, instead, articles were printed on consecutive pages, with full page ads used as spacers. . . .

To repeat, unless such articles can be removed for incorporation in special files, they are completely useless to the serious reader. No responsible person will quote or make use of anything thus read without having reviewed it at the time of practical application and having compared it with other authorities in his files. . . .

If three different pieces of equipment were delivered by a manufacturer with the various parts all thrown together in a couple of barrels and packing cases, that would be the last that manufacturer shipped.

So why can't we have complete assembly where it counts most? Why must "the vacuum tube explained" on page 89 be forever lost be-

cause the article on page 90 will go into another file?

If the subject was not one of importance, the writer would not have taken the trouble to type this long letter in this hot weather.

WALTER OTTO
W. Otto Bros. Maintenance
Co.
Forest Hills, N. Y.

Make-up involves many problems, and like many editorial policies, is dictated by readership, preferences, and mechanical limitations. Suggestions and comments are





always welcome because they reflect reader interest and stimulate revision of make-up into the most practical form.

Extra pages from any issue, which would permit readers to file complete articles, are available upon request.—ED.

Painting Copper

We have a customer for whom we installed a moulded copper gutter and he has asked us how to paint this material. He claims his painter said it is impossible to paint this gutter.

What do you suggest?

J. M. FERGUSON
J. M. Ferguson Heating Co.
Joliet, Ill.

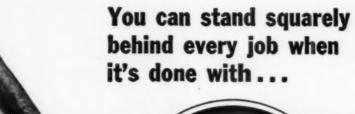
"Modern Application of Sheet Copper in Building Construction," published by the Copper and Brass Research Association, 420 Lexington Avenue, New York 17, N. Y., says that copper can be painted satisfactorily and any desired color effect can be obtained.

"... must be free from dirt and oil or grease, and absolutely dry. Copper that has weathered through two or three rainstorms will ordinarily have had the oil film, remaining from rolling operations, washed from the surface ... indicated by a slight tarnish ... to obtain a satisfactory spread and adherence of paint.

"Lead base paints should be used for painting all copper work."—ED.

Fingers on the Pulse

"Consumer Analysis of the Greater Milwaukee Market," compiled and published by the Milwaukee Journal, surveys the buying habits of





COP-R-LOY SHEETS · EAVES TROUGH GALVANIZED SHEETS · FURNACE PIPE GUTTER · ROOFING ACCESSORIES

Wheeling's Modern Equipment Means Uniform Quality

WHEELING CORRUGATING COMPANY • WHEELING, W. VA.

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CHICAGO

CLEVELAND PHILADELPHIA

PITTSBURGI

DETROIT RICHMOND KANSAS CITY ST. LOUIS



869,586 inhabitants of the area.

In a total of 244,954 families in Greater Milwaukee, 47.2 per cent (115,618) are home owners and 52.8 per cent (129,336) are renters. A total of 98,295 families or 76 per cent of the renters expressed a wish to own their own homes. Of the latter, 55.6 per cent would buy a home under \$10,000, and 29.2 per cent would pay from \$10,000 to \$15,000; 30.8 per cent could make a down payment of less than \$2,000, and 33.5 per cent, from \$2,000 to \$4,000.

In answer to the question: How is your home heated? 77.4 per cent checked coal or coke, 19.7 per cent oil, and 4.2 per cent gas.

As the late summer furnace cleaning season goes into full swing, records from cleaning and service programs continue to substantiate the sales volumes that always develop from this activity.

An analysis of 4,505 cleaning jobs in the Minneapolis-St. Paul area resulted in the following percentages of additional work:

- 50 per cent needed new grates
- 40 per cent needed new smoke pipes
- 25 per cent needed resetting

Similar experiences in Pennsylvania, Ohio, Illinois, Nebraska, Wisconsin, Indiana, and Missouri confirm these percentages and the pay-off comes in the fact that:

7 per cent needed new furnaces

a figure which appears to reflect sales resulting solely

COMPLETENESS AND DEPENDABILITY Profit

IN Peerless Electric PACKAGE UNITS AND BLOWERS

• Peerless Electric blowers and package units are manufactured *complete* in the Peerless plant. Peerless is *not* an assembled line.

Peerless equipment is dependable—you minimize service worries because Peerless equipment is designed and engineered from 56 years experience in producing quality electrical apparatus. And you'll find that Peerless blowers and package units are priced right to earn a profit for you. Write for detailed information.

PEERLESS ELECTRIC AIRBOY BLOWER ASSEMBLY

A direct drive blower that delivers 850 cubic feet of air per minute. 3-speed blower with

motor blower unit rubber cushioned. Blower wheel dynamically and statically balanced. The two motor bearings are the only bearings in the unit. Also supplied with cabinet and air filters as a complete package unit.



DIRECT DRIVE BLOWER
ASSEMBLIES
You'l sembair confinest

You'll find Peerless blower assemblies in many nationally-sold air conditioning furnaces of the finest quality. We furnish both of these assemblies ready to install in your own furnaces or cabinets. The many fine construction qualities of these blowers add valuable sales features to your heating units.

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MOTORS · FANS · BLOWERS



from deterioration and obsolescence without the use of high pressure selling.

Would a 10 per cent price reduction by manufacturers result in a substantial reduction at the consumer price level and thus increase sales volume by reaching lower income brackets and inducing purchases by buyers who have been on the fence? This and similar questions were asked of wholesalers serving the heating, plumbing, and hardware fields and the following summarizes the replies:

(1) Price reductions would be passed on by the wholesaler to the dealer and (2) by 69 per cent of the dealers to the consumer. When asked if increased volume at lower prices would result in satisfactory profits (3) 93 per cent said "yes" but (4) only 30 per cent said "yes" when asked if lower consumer prices would actually increase volume; 66 per cent said volume would remain the same. (5) When asked what a price reduction at the manufacturing level would mean at the dealer level, after being passed on to the dealer by the wholesaler, 3 per cent said a 30 per cent price reduction, 9 per cent said 15 to 20 per cent, 45 per cent said 10 to 15 per cent, 18 per cent said 5 to 10 per cent, and 9 per cent said 1 to 5 per

Good Salesmanship is still pounding the pavement . . . not warming a chair.

Address the editors 6 North Michigan Avenue Chicago 2, Illinois



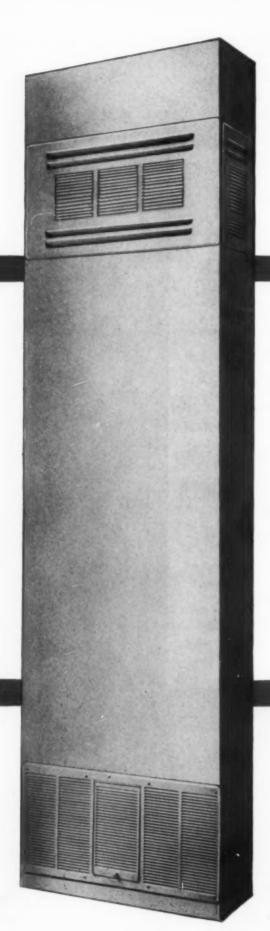
SINCE the year 1886, when Sall Mountain Company was founded, this company has taken a leading position in manufacturing Asbestos Products and in the fitting of asbestos to an ever widening field of industrial uses.

The latest in advance equipment is of course, important, but most important is the long years of Sal-Mo experience in solving problems involving the use of Asbestos.

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> At our mills we have the latest improved and highly specialized equipment and machinery for processing Asbestos and Arbestos Products.

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royal jet-flow means extra profits this heating season

The new easy to sell Royal Jet-Flow gives all the advantages of a forced air unit ... yet costs only slightly more than a highly competitive floor furnace. Through the use of the jet principle the gas-fired Royal Jet-Flow achieves the amazing velocity of 300 feet per minute without blower or fan. Heats an entire house with a minimum of temperature differential from room to room and ceiling to floor.

The new Jet-Flow is designed to be installed with a minimum of labor and a maximum of profit . . . is now, for the first time, available for general distribution.

Exclusive dealerships are open

in certain areas... write today and find out all about the new easy to sell, easy to install Royal Jet-Flow. Don't pass up this extra profits opportunity.



OVER 50,000 INSTALLED IN HOMES BY AMERICA'S LARGEST BUILDERS

True test of heating equipment is its acceptance and performance. Here are excerpts from letters by builders who have had hundreds of Royal Jet-Flows installed in houses they have built.

FRITZ BURNS Kaiser Community Homes

OOO Royal Jet-Flows

The Royal Jet Flow has become one of our best salesmen. It has given top performance under all conditions. In appearance, design, aconomy and engineering we feel that the Royal Jet-Flow is the perfect answer for modern homes."

M. J. BROCK M. J. Brock & Sons, Inc.

210 Rayal Jet-Flows

We have found the Royal Jet-Flow to be one of the major selling points in our subdivisions. a remarkable development in home heating giving the small home owner the type of heat here-tolore available only in a high-cast home.

J. R. ASHTON Del E. Webb Construction Co.

825 Royal Jet-Flows

825 Rayal Jet-Flows.

We investigated every type, of heating equipment in the nation before making a decision to use the Rayal Jet-Flow.

It offers such advantages, as clear wall space for furniture placement, excellent heat distribution. Our experience is proving this superior heating equipment places us at a distinct advantage in today's competitive market."

A. QUINCY JONES Architect

825 Royal Jet-Flows

825 Royal Jet-Flows

We feel the Royal Jet-Flow
has proven itself as being
everything that was expected
or hoped for Since the project
was completed. I have
talked to many families living
in the houses and they were
very enthusiastic about their
heating equipment.





LUMBINE ... STE The Country Courter of Country Air Conditioning

No. VHC-75-E, Oil



No. GHC-95-E, Counterflow Air Conditioning Unit 76,000 BTU at Discharge Outlet



Interior view of Counterflow unit with Gas Burner installed

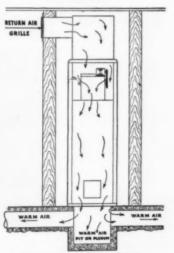


Diagram of Counterflow Unit in building with Concrete Slab Floor

For Ranchtype Homes . . . Homes Without Basements

for GAS...for OIL

For the house with floor panel heating - warm air pipes imbedded in the concrete slab floor! For the house with warm air pipes imbedded in the concrete floor slab, but discharging into warm air registers!

For the house with warm air pipes installed in the crawl space under the concrete slab floor and above the ground!

For the thousands of basementless houses and buildings for which architects and builders want the heating pipes in or under the floor, the Luxaire Counterflow Utility Air Conditioning Unit was designed.

With blower located at the top of the cabinet, discharging warm air downward through the base of unit into pit or plenum chamber provided in or below the concrete slab, the new Luxaire Counterflow provides a low cost heating plant that requires a minimum of space in houses where space is at a premium.

This new unit comes equipped with either the Luxaire Gas Burner or the Luxaire Pressure Vaporizing Oil Burner and burns either fuel with equal efficiency.

The unit is shipped assembled, ready for the installation of the burner, which can be installed in a few minutes.

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ARLINGTON. A modern steel furnace, in pipe and pipeless models, for coal, oil or gas. Heavy steel heating element. Four sizes, from 20 to 27" shell diameters. 67,800 to 100,800 Btu capacity at register.



SENECA. A low cost steel gas fired winter air conditioner for average size homes. Colorful jacket conceals all controls. Corrosion-resistant steel heating element has cleanable features. Five sizes, 47,600 to 102,000 Btu capacity at register.



WYANDOTTE. A steel gas fired winter air conditioner for small homes, with or without basements. Four sizes, from 48,000 to 84,000 Btu capacity at bonnet. The three smaller sizes are factory assembled and pre-wired.



SHAWNEE. A compact, attractive gas fired gravity furnace for economical heating. Efficient copper bearing steel heating element with cleanable features. Made in five sizes, from 36,560 to 78,750 Btu capacity at register.



CHIPPEWA. A cast iron gas fired winter air conditioner for small homes—can be installed in utility rooms or closets. Factory assembled and pre-wired; side or bottom return air inlet. Like all gas fired warm air products by American-Standard, it burns manufactured, natural, mixed, or liquefied petroleum gas. Provides 48,000 Btu capacity at bonnet.



THE MOHAWK. A cast iron gas fired winter air conditioner, offers all the advantages of completely automatic gas heating. Handsome jacket. Durable cast iron heating element, dependable automatic controls, efficient burner. Nine sizes, from 40,800 to 204,000 Bru capacity at register.

AMERICAN-STANDARD + AMERICAN BLOWER + CHURCH SEATS + DETROIT LUBRICATOR + KEWANEE BOILER + ROSS HEATER + TONAWANDA IRON

A complete line covering every warm air heating need

The finest quality products ever made

WINTERGLO. A new steel oil fired winter air conditioner—"high boy" type utility unit for small homes and individual apartments. Factory assembled and pre-wired; two sizes, 85,000 and 105,000 Btu capacity at bonnet.





ALLERTON. An attractive, moderatelypriced steel winter air conditioner. Burns coal, oil or gas. In four sizes, 20 to 27" shell diameters, from 86,100 to 127,900 Btu capacity at register.

SARATOGA. A small steel oil fired winter air conditioner with quality features. Offers the advantage of automatic oil fired winter air conditioning with the Arcoflame or other suitable burner. Provides 95,000 Btu capacity at reister.



VALUE No. 1—a Complete Line, means more and easier sales for you. For with the well-known Sunbeam line, you can offer prospective customers their choice of warm air furnaces and winter air conditioners from the widest range of quality products on the market. This American-Standard line covers units for any type and size of installation . . . and for any kind of fuel. Value No. 1 also means that you get all the benefits of dealing with *one* dependable name — an advantage that strengthens your sales story.

VALUE No. 2 — Quality Products, means that when you handle the Sunbeam line by American-Standard, you have products that are styled to stand out on any sales floor and built to stand up in any installation. In styling . . . in engineering . . . in construction . . . the quality of American-Standard Heating Equipment is second to none.

For detailed information about the complete line, contact your Wholesale Distributor. He will also tell you about the greatest package of selling aids ever offered the warm air heating industry.

American Radiator & Standard Sanitary Corpo-

ration, P. O. Box 1226, Pittsburgh 30, Pa.



You can't miss with a line-up like this

AMERICAN-Standard
First in heating . . . first in plumbing

SHEET METAL SCREW... WITH SHEET METAL MEN







FOR HEAVY SHEET METAL WORK

Use P-K Type "Z" for sheet metal .050" to .200" thick. For sheets or plates over .200° thick, use the heavy duty Hex Head Type "Z". For stainless steel installation in dairies, laboratories, hotel kitchens, etc., use Type "Z" stainless.

It's no easy trick to make a hardened self-tapping screw. It must be hard.—to tap its own matching threads clean and fast. But if it's too hard, the head may pop off when you drive it. Parker-Kalon learned the trick when they pioneered the Type "A" Sheet Metal Screw,-learned how to keep hardness and toughness properly balanced in every screw. And there's no substitute for 35 years' experience. That's why P-K Type "A" is still first choice of leading sheet metal contractors everywhere.

If you are still tapping, bolting, riveting, or soldering where you could use sheet metal screws, get acquainted with P-K Type "A", and all the others in the famous P-K family of fasteners! Start making the savings you're missing!

Sold Only Through Accredited Distributors



MEET THE FAMILY OF P-K FASTENINGS

Write for Booklets Nos. 480 and 475A. Booklet 480 lists proper hole sizes for efficient driving and maximum security, plus other helpful information. SAMPLES, too. Just tell us what you are fastening. Parker-Kalon Corp., 200 Varick St., New York 14





PARKER-KALON PRODUCTS COLD-FORGED SOCKET SCREWS, WING NUTS, THUMB SCREWS . HARDENED SCREWNAILS AND MASONRY NAILS SHUR-GRIP FILE AND SOLDER IRON HANDLES . METAL PUNCHES . DAMPER REGULATORS AND ACCESSORIES



THERE'S NEW BUSINESS IN THE BASEMENTS ALL OVER TOWN!

YOU can get it...with the

ALL-YEAR CONDITIONER

(BLOWER-FILTER PACKAGE)

PRICED
TO PRODUCE BUSINESS

You make your regular profit, though these are the lowest-priced blower-filter units on the market. They're priced to win a big slice of NEW business for you, beat out campetition, and turn prospects into sales. The big value af top quality at a new low price will make a friend with every sale.

DESIGNED AND MANUFACTURED ENTIRELY BY "UTILITY"

Be Headquarters for

with the



For prices, catalog sheet, and complete details on how we help you sell, send the coupon NOW.

appliance corp.

Count up the gravity warm air systems around town! Plenty of those home owners are live prospects for better heating and fuel savings. That's what you can give them—through conversion to a

forced-air system with a Utility All-Year Conditioner. It's extra money, extra busi-

ness...that you can get from your old customers, and your competitor's old customers.

The Utility All-Year Conditioner is built to make

friends for you. A dynamically-balanced, high

performance *Utility*-built blower, motor, Fiberglas filters, and variable pitch pulley, are enclosed in

a heavy steel cabinet. You can install it quickly, easily. With three models providing a CFM rating

range of 700 to 2600, you can take any job.

4857 S. Alameda St., Los Angeles 11, Calif.

DIVISIONS

Gaffers & Sattler . Occidental STOVE CO.

FORCED AIR FURNACES WALL HEATERS SINGLE AND DUAL UNIT HEATERS
SUSPENDED TYPE

Get the whole

profit

picture!

Please send complete information on your All-Year Conditioner, how you help us sell, and the *Utility* dealership arrangement.

NAME

ADDRESS

CITY

ZONE STATE

Facts it will pay you to know

about STAINLESS STEEL for Roofing Products

ULTIMATE COST IS LESS—The cost of properly designed stainless steel roofing products, gutters, downspouts and flashing, etc., will be little or no higher than those made from other materials which are inferior in strength or corrosion resistance. Because replacement and maintenance expense is eliminated when stainless is used, the ultimate cost is extremely low.

DURABILITY IS UNSURPASSED—Installations made more than 20 years ago show no signs of deterioration, even in industrial atmospheres. Cleaning with soap and water discloses the original color and surface. Because the strength and corrosion resistance of Stainless Steel are so much greater than that of other materials, thinner gages can be used with no sacrifice of service life.

STRENGTH IS GREATER—Stainless has tensile strength, impact strength, abrasion resistance, and hardness far superior to competitive materials. The tensile strength is substantially increased by the cold working employed during the forming of the material into gutters and downspouts.

NO MAINTENANCE NECESSARY—Installations more than 20 years old indicate that no maintenance is needed when stainless gutters, flashings, downspouts, and finials are properly designed. Painting or other surface protection is not required. (If color is desired, paint can be applied without difficulty.) Washing with soap and water will keep the surface bright.

Because stainless steel will not react with chemicals in the atmosphere, adjacent wood or masonry will not become stained or otherwise discolored.

FABRICATION NOT DIFFICULT—The usual sheet metal shop equipment is adequate and practices are similar. The greater stiffness of stainless causes little difficulty because gages are usually thinner than those customary with some other materials. Fabrication procedure on the job is similar to that of other materials. The standard 50-50 solder is satisfactory.

ERECTION NO DIFFERENT—Installation practice for stainless steel is identical with that used for other roofing products. Hangers, screws, nails, rivets and bolts should be of stainless material. Hangers can be placed up to 30 inches on centers and should be made of 14-gage material, about ½ inch wide. Complete gutter lengths can be as long as 40 feet.

SUGGESTED GRADE OF STAINLESS— $U \cdot S \cdot S$ 18-8, (Type 302) is suggested for most roofing products such as gutters, downspouts, flashing, roofing sheets, finials and other trim. Stainless should be used in all fittings and fasteners.

AVAILABLE NOW — U.S.S Stainless sheet and strip in the above grade is stocked by most warehouse suppliers, and by United States Steel Subsidiaries.



AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, ONIO - CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO - NATIONAL TUBE COMPANY, PITTSBURGH - TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST - UNITED STATES STEEL EXPORT COMPANY, NEW YORK



U·S·S STAINLESS STEEL

SHEETS . STRIP . PLATES . BARS : BILLETS . PIPE . TUBES . WIRE . SPECIAL SECTIONS

9-1403

UNITED STATES STEEL

Headquarters for...



Forced Air

FURNACES

Smooth modern design. Compact, for small space

installation. Fully auto-

matic. Utility-built blowe

and burner. 4 sizes-BTU range, 75,000 to 150,000.



that's YOU - with the Comments line

Here's a powerful sales tool that makes you stand head and shoulders above the crowd of heating dealers and contractors shouting the same old story. "Headquarters for Guaranteed Heating Performance" brands YOU as an expert heating counselor who combines know-how and UTILITY equipment for heating satisfaction. To put this idea over permanently

- and to produce immediate business -Utility gives you a powerful advertising

and sales program.

With the Utility line you have the units to get both residential and commerical jobs...with BTU capacities to fit any size job. Top quality and efficiency have been proved in the quarter-century of Utility production.

Get the whole story on this unbeatable combination of customer satisfaction and sales success for you.

Suspended UNIT HEATERS

Completely self-contained. Quiet-slow speed, resilient base motor on streamline mounts. Individual burner for each element section prevents flame impingement. 4 sizes—BTU range, 60,000 to 225,000.



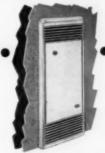
4855 S. Alameda St., Los Angeles 11, Calif.

Gaffers & Sattler . Occidental STOVE CO.



ALL-YEAR CONDITIONER (Blower-Filter Package)

Dynamically balanced, high performance Utility-built blower, Fiberglas filters, variable pitch pulley, heavy steel cabinet. CFM ratings from 700 to 2600.



Single and Dual WALL HEATERS

For every type of single and multiple-story structure. Pre-assembled with plaster guides and headerfor installing in any 4" wall without furring. 3 sizes—BTU range, 25,000 to 50,000.

natcher



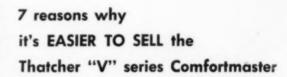
Pioneer in heating in 1850 . . .

Leader in modern home comfort today

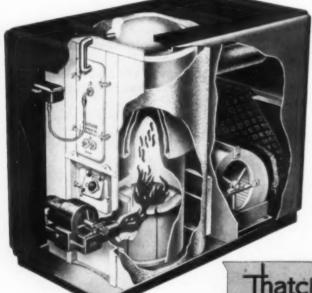
or 99 years in the industry. Thatcher has always been a leader in discovering, developing, and perfecting what's new and better in home heating.

Typical of Thatcher's advanced design is the "V" series Comfortmaster - featured next month in Small Homes Guide. It's a completely automatic, oil-fired winter air conditioner. For the home owner, it's a lifetime investment in carefree comfort.

You'll find superb units for most every type of residential heating need in the one Thatcher line. So make a partner of Thatcher's long experience in building modern, trouble-free equipment. Recommend Thatcher-for a minimum of trouble, a maximum of efficiency.



- Flange Mounted Oil Burner
- Modern Maroon and Grey Slip-Joint Cabinet
- **Tailor-Made Combustion Chamber**
- **Automatic Vaporizing Humidifier**
- Squirrel Cage Type Blower
- **Welded Steel Gas Tight Radiator**
- * All Parts Easy To Reach



Call on us at Booth 687 National Oil Heat Exposition, Boston -May 16-20



Specialists in Heating since 1850 GARWOOD, NEW JERSEY



Comfort-

Oil-Fired

Winter Air

Conditioner

master

New 550 Oil-Fired Winter Air Conditioner



Comfortmaster Gas-Fired Winter Air Conditioner





A-204

Oil-Fired



Triple-Fire All-Purpose







Oil-Fired





Gravity

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CRAFTSMEN QUALITY

RECOGNIZE by these fine features in a

SCREWDRIVER



EVERYBODY RECOGNIZES QUALITY by this Trade-mark CRESCENT TOOLS Sign of the Artisan Symbol of Excellence

"Crescent" is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

COMPANY, JAMESTOWN, NEW T O O L CRESCENT

RYBOLT SERIES RS 85
Steel Gas Winter Air Conditioner

RYBOLT SERIES RSG 85 Steel Gas Gravity Furnace

Rybolt STEEL GAS FURNACES

SPACE AND FUEL SAVERS THAT MEET TODAY'S NEEDS

In line with today's requirements these Rybolt gas-fired units are unusually compact to save space—they can be installed anywhere in basement or first floor utility room.

They save fuel, too, because the scientifically engineered heavy gauge steel heating elements provide rapid heat transfer which facilitates fuel consumption economy.

Installation cost also is reduced to a minimum because the RS 85, the small air conditioning unit, and the RSG 85, the gravity unit, come completely assembled as package units. The RS 110, the larger air conditioning unit is shipped knocked down but is extremely easy to assemble on the job with very few screws or bolts, because of its slip joint construction.

Another big advantage, permitting ease of service and inspection, is the fact that the heating element can be readily removed without dismantling the furnace.



RYBOLT SERIES RS 85, steel-gas fired winter air conditioner (85000 BTU) is unusually compact, convenient and economical.

RYBOLT SERIES RS 110 is the same design as RS 85 but larger in size $(110,000\ BTU)$.

RYBOLT SERIES RSG 85 is a steel gas-fired gravity furnace, compact, simple to operate and economical, comes in one size only, (85000 BTU).

Write for full information



THE RYBOLT HEATER COMPANY

615 MILLER STREET

4

ASHLAND, OHIO



It's a fact: you need use no special tools, equipment or methods to give your customers all the advantages of Berger ENDURO Stainless Steel Roof Drainage Systems. 28-gauge ENDURO works as readily as familiar 26-gauge galvanized steel. Its light weight and its rigidity make it easy to handle and to hang ... especially in time-saving long lengths.

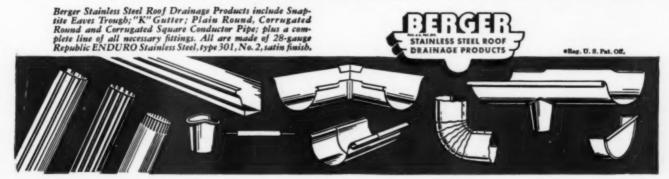
Your ordinary good soldering practice need be varied only slightly. Use a large iron, slightly hotter than you use for general work, and 50-50 or commercial stainless steel solders. Immediately after soldering, wash off all traces of acid or flux with a 5% to 10% solution of washing soda, and water. Several special

stainless steel fluxes are available, if desired.

Finally, be sure to hang stainless steel fittings and accessories, too. An all-ENDURO Roof Drainage System is stronger and more attractive than ordinary systems ... does not bleed or discolor paint ... resists rust and corrosion ... resists abrasion and denting. It actually costs your customer less over the years, while the installation means more profit for you, now.

Your jobber can supply you with the full line of ready-to-use Berger Roof Drainage Products made of Republic ENDURO Stainless Steel. He also carries Berger Drainage Products in galvanized steel and in copper.







The exclusive Winkler FUEL METER always delivers the same amount of oil, regardless of viscosity. Hence, the fuel-air ratio remains



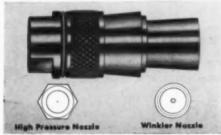
The exclusive FUEL AERATOR (a "Rollator" type pump) intimately mixes exact amounts of air and oil and forces this oil-saturated vapor to the nozzle.



WHY THE WINKLER PMAKES **NEW ECONOMY RECORDS!**



The adjustable FLAME CONTROLLER delivers secondary air in 3 concentric zones, producing air patterns to suit exactly the capacity of the Fuel Meter.



The extremely large opening in the Winkler TURBA NOZZIE does not become clogged by dirt particles nor is the rate of oil flow through it affected by changes in viscosity.

A new approach to the science of oil combustion enables the Winkler LP* Burner to set an astonishing standard of economy and performance. This burner perfects low pressure operation -eliminates old service troubles and the extravagant waste of oil so common with conventional oil burners.

At left are shown a few of the design improvements which are exclusively Winkler developments. They are the reasons Winkler LP* Burners are selling at sight—to both new users and to present owners of oil burning equipment.

The Winkler LP* achieves its economy in four ways. It can be sized to burn as little as 1/2 GPH-ending oversizing waste in the small heating plant. It saves service expense because of its utter simplicity and clog-proof nozzle. It ends the inefficient short runs usual with oversized burners . . . and, it is not critical of oil.

Don't delay in getting your share of Winkler LP* profits—write today for full information on this burner you can sell now!



This Winkler LP* Demonstrating Unit convinces prospects! Right in your own showroom it burns crankcase drainings-mixed oil and water-"hard-cracked"oil—heavy,unrefined oil . . . all without smoke or soot. An amazing proof of Winkler superiority.

WINKLE RU. S. MACHINE CORPORATION

Automatic Heating Equipment

Dept. O-A8 Lebanon, Indiana

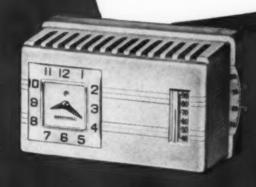


You're rushing to take care of your customers.

We're rushing to take care of YOU.

Don't get caught with your control stocks down.

Order Now!



"DEPENDABLE CONTROLS
COST LESS THAN SERVICE"

COMPORT Promotherm

Honeywell CONTROL SYSTEMS



We've been shouting "greater manufacturing efficiency"... "continuing research"... "more for the money" — and we back our claims — not only with "documentary evidence" and "notarized proof" and testimonials to our engineering and productive genius — but also with crisp, folding money... with savings in cold cash that mean greater profits for Mor-Sun Merchandisers!

American automobiles are the finest in the world—and the greatest value—because of the American assembly. line production technique. For almost four decades, as a manufacturer of body sections for the automotive industry, we have been part and parcel of the development of this technique. Why—we reasoned—can't this "know how" be adapted to the production of a quality furnace which could compete in price with ordinary furnaces?

Right from the start we placed our furnace manufacture on this precision mass production basis. We noted that the lowest-priced automobile was inexpensive — but not "cheap". Cheap furnaces — like cheap automobiles — have never long held an important position in the American economy. So we designed, engineered, produced and marketed the best furnace and started cutting costs — not quality!

The new price schedule for the MOR-SUN line of die-pressed steel warm air furnaces reflects the economies we effect through automotive assembly -line engineering. This is a continuing project in our furnace division — as in our automotive division — and reflects economies which are reflected in your sales volume . . . your net profit!

You'll want more detailed information about the MOR-SUN line, its many competitive advantages and its new price schedule. It's yours for the asking . . . but ask for it today!



"The Sun Never Sets with Mor-Sun"

MORRISON

STEEL PRODUCTS, INC. BUFFALO 7, N.Y.



VENTILATORS

Place your order NOW for Fall Requirements



ow back in the line and built to the same precision standards characteristic of all H&C products . . . the best possible means of circulating air from a lower to an upper room.

The No. 2250 Ventilator consists of one floor register, with valves, and one white japanned steel face, connected by a telescoping tin box adjustable from 6 to 12 inches. Floor register is available in Black Japan or in the H&C superb oak finish. Two coil springs hold the white ceiling face firmly in position. Each Ventilator is fully assembled, ready for installation, when shipped, packed in separate corrugated carton. See them at your H&C Jobbers' or write for details.

For every type of installation, you'll find the ideal register in the H&C line — superior in design, construction and finish and backed by the kind of service that really counts! Write for current catalog — No. 49. Prompt Deliveries on all standard items.

World's Largest Manufacturers of Registers, Grilles and Furnace Accessories

IN CANADA:
HART & COOLEY MANUFACTURING CO., FORT ERIE, N. ONTARIO





No. VUC-75-E, Oi Counterflow Air Conditioning Unit 75,100 BTU at Discharge Outlet



No. GUC-95-E, Gar Counterflow Air Conditioning Unit 76,000 BTU at Discharge Outlet

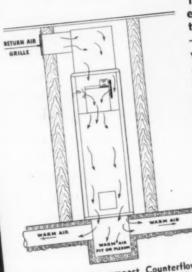


Interior view of Counterflow unit with Moncrief Gas Burner installed

THEY'RE NEW! They do the NEW JOB! MONCRIEF'S

Counterflow

Air Conditioning Unit for GAS . . . for OIL



Sketch showing compact Counterflow Unit Installation on Concrete Floor Slab

They do the heating job that many builders and architects want today in ranch type homes — homes without basements — homes with concrete slab floors.

With Blower installed at the top of the unit, discharging the warm air downward through the base of the cabinet, the new Moncrief Counterflow Unit can be installed directly over a pit or plenum stalled directly over a pit or plenum chamber provided in the concrete slab floor of the basementless home or building.

The new Moncrief Counterflow Unit provides a low cost installation, requiring a minimum of valuable floor space, in buildings where the heat pipes are desired in or under the concrete slab floor. Designed to burn either Gas or Oil, and signed to burn either fuel, the new highly efficient with either fuel, the new Counterflow Unit is shipped assembled Counterflow Unit is shipped assembled ready for the installation of the Moncrief ready for the installation of the Pressure Gas Burner or the Moncrief Pressure Vaporizing Oil Burner.

THE HENRY FURNACE COMPANY

Medino, Ohio

HEATING AND AIR CONDITIONING UNITS



FURNACE PIPE AND FITTINGS

The Challenge of twelf the hour changes 2



6

There's a challenge in twelfthhour changes—a challenge that Delco Products takes pride in meeting.

Delco Products' sense of responsibility extends far beyond the mere filling of orders. Each customer is regarded as a partner on a project. His individual needs are recognized . . . his problems solved through unstinting cooperation.

All of Delco's resources are geared to the tempo of today's manufacturing. Delco has the years of experience in the appliance field needed to combine quality and quantity production. Delco has the ability to work fast. And when occasion arises, Delco has the flexibility to make schedule changes without seriously breaking stride.

DELCO MOTORS

DELCO PRODUCTS



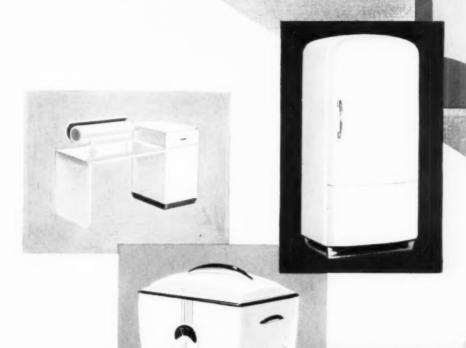
Division of General Motors Corporation, Dayton, Ohio

Sales Offices: CHICAGO . CINCINNATI . CLEVELAND . DETROIT . HARTFORD





Weirzin



TAKES PAINT EASILY— HOLDS IT FAST



Paint stays put—and so do enamels, lacquers, varnishes, lithographic inks—on products made of bonderized Weirzin as supplied direct from Weirton in coils or cut lengths. Paint and other finishes, once applied, are there to stay—safe from the marring effects of underfilm corrosion, which just cannot occur in Weirzin. Its tight malleable zinc coating, electrolytically applied, is integrally bonded to the steel—to remain intact through manufacturing operations, and under all conditions of temperature and humidity.



WEIRTON STEEL CO.

WEIRTON, W. VA., Sales Offices in Principal Cities
Division of NATIONAL STEEL CORPORATION, Executive Offices, Pittsburgh, Pa.

Announces a New, Low-Priced

POWER SHEAR FOR LIGHT SHEET METAL

NIACARA

 Here is the new high speed Power Shear that sheet metal men have been waiting for.
 New advanced engineering...new styling ...new, easy, fast operation.

THE GREATEST DOLLAR for DOLLAR SHEAR VALUE YOUR MONEY CAN BUY

 This new Niagara high speed Power Shear is designed for light sheet metal work. One look at its distinctive styling indicates its modern performance.

Fabricated from unbreakable steel plate, it is engineered to combine strength and stiffness for accurate cutting.

Clear visibility of cutting line through cut-outs and over the top of holddown facilitates shearing to an accurate layout line.

Niagara Alloy Tool Steel Knives heat treated to a high degree of hardness and toughness and pre-

cision ground for accuracy provide keen cutting edges for longer service between grinds.

Quick Acting Back Gauge and convenient front and side gauges.

Capacity—20 gauge.
30, 36 and 42 inch cutting lengths
125 cuts per minute.

Write for complete information and low prices.

See how the new PANCAKE MOTOR DRIVE provides the most compact construction ever obtained... minimum floor space, maximum safety.

NIAGARA MACHINE & TOOL WORKS . BUFFALO 11, NEW YORK





ed

ETAL





Fig. DSC—Durabilt Intake.

Also ideal for floor furnace use.

(Any size Grille desired).



Women's high heels and chair legs cannot be wedged into DuraBilt Floor Registers and Intakes. The narrow mesh (7/16" x 1-15/16" opening) excludes all small objects. This also helps conceal the register box interior. DuraBilt employs the most widely approved engineering design for this type of register—much superior in strength to any stamped-out floor register, because of solid narrow bars and fabricated construction, which also increase the open area.

Every DuraBilt is a precision-made product, with substantial flat steel bars set edgewise, and securely mortised and interlocked at every crossjoint. This assembly is forced together on a press, and tenoned and locked into welded, reinforced frame. This rugged structure will support excessive weight and should never pull apart. Special Auer spring tension valve adjustment positively holds valve where set. Beautiful new luminescent Dura-Lustre as well as other finishes. For maximum strength and durability, insist on Auer-made DuraBilt Registers, made ONLY by The Auer Register Company.

Write for complete Auer Register Book illustrating and listing all models for both air conditioning and warm air systems. Special Perforated Grille Catalog "G" also sent on request.

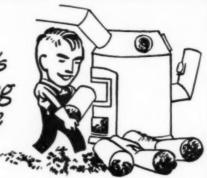
THE AUER REGISTER CO., 3608 Payne Ave., Cleveland 14, Ohio



This man was cold last winter



This man's remodeling his home



This man's building a new home



THEY'RE ALL CUSTOMERS RIGHT NOW

FOR



Other KO-Z-AIRE Conditioning Units available for heating needs to 350,000 BTU.

CONDITIONING UNITS

The field is wide open for fast sales . . . quick profits NOW with KO·Z·AIRE, the Conditioning Units that are easy to sell. Carefree, dependable winterlong warmth with clean, economical oil or gas firing and complete automatic control make KO·Z·AIRE the perfect conditioning unit for every home.

Dealers all over the country report the KO·Z·AIRE line has doubled and tripled their sales. Get busy NOW, turning your prospects into customers with KO·Z·AIRE.

MAIL THIS COUPON TODAY!

Jones & Brown, Inc. 439 Sixth Avenue Pittsburgh 19, Pa.

Yes, I'm interested in quick profits with KO-Z-AIRE, Rush full information on choice territories still open.

NAME

ADDRESS_

TY____STATE

MO-Z-AIRE

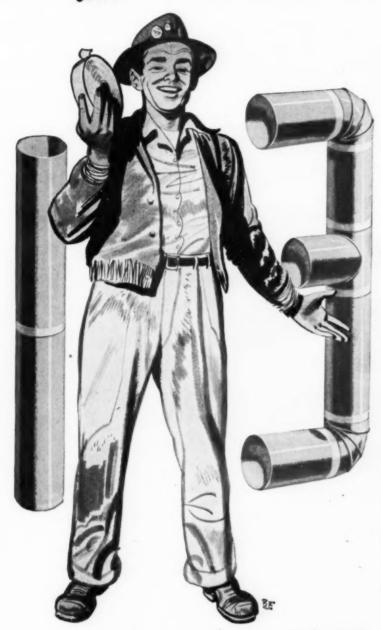
Nationally Distributed by

JONES & BROWN, INC.

39 SIXTH AVENUE

TISBURGH 19 PA.

"Gran seal a pipe joint in 13 SECONDS, this NEW, easy way" "IT'S SO EASY to seal pipe with Bauer & Black Industrial Adhesive Tone No. 2001 To



**IT'S SO EASY to seal pipe with Bauer & Black Industrial Adhesive Tape No. 290! There is no paste, brush, mixing or mess, just a single material in a single size—a 1½ in. x 36 yd. roll of self-sealing Fiberglas* tape! You strip No. 290 around the seam, cut the roll loose and the seam is sealed for good—all in less than 15 seconds! The finished job is neat, and the seal actually improves with age."

TAPE NO. 290 is outstanding for pipe sealing because of the two unusual materials that make it up:

- Fiberglas* cloth backing—tough, super-strong, resistant to heat, corrosion and aging.
- Flame-resistant, thermo-setting adhesive. Self-sealing on any sheet metal. *Vulcanizes* under operational temperatures.

Write Dept. T-8 today, or phone your distributor or jobber for full information on Tape No. 290 and other Fiberglas tapes specially designed for heating, piping and air conditioning.

7 REASONS WHY TAPE NO. 290 SEALS PIPE BETTER

- 1. Speedy, safe, permanent seal
- 2. Sticks fast to any sheet metal
- 3. Absolutely non-corrosive
- 4. Increases structural strength of joints
- 5. No paste, no brush, no mixing, no mess
- 6. Clean, neat, permanent
- 7. Actually costs less to install in many applicationsl

*Fiberglas (Rog. U.S. Pat. Off. by Owens-Corning Fiberglas Corp.)

A product of

BAUER & BLACK

Division of The Kendall Company . 2500 S. Dearborn St. . Chicago 16

Industrial Adhesive Tape

Production Short Cuts to Reduce Costs · Research to Speed and Improve Methods



Check these outstanding features of the Type 500 gas conversion burner

A.G.A.-listed for 125,000, 175,000, 225,000 and 275,000 Btu Input Capacities

- Exclusive Flame Bowl stainless steel. Directs hot products of combustion against walls of heat exchanger for maximum heat extraction and economy.
- Efficient Burner cast iron. Deep-slotted, adjustable port burner assures long life, quiet extinction.
- 3 Electric Pilot Igniter non-cycling, provides means for lighting pilot external to the unit. Optional.
- Adjustable Air Panel vertical inset manual-type, to control the amount of primary and secondary air. Usually set with permanent adjustment.
- 5 Adjustable Legs for easy leveling and adjustment of height of unit.
- 6 Removable Housing—handsomely styled, finished in Mueller green crinkle lacquer. Easily accessible.
- Easily Installed shipped completely assembled; no refractory necessary; easily serviced.





GAS CONVERSION BURNER

An Outstanding Unit in the Famous Mueller Line

(For converting existing furnaces and boilers)

With gas heat now available or soon coming to many markets throughout the United States, dealers are finding they must have a well known, top-quality gas conversion burner — a burner with public acceptance, which they can sell competitively.

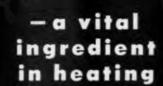
That's why profit-minded heating men in every market are tying in with the famous Mueller Climatrol line—because the widely known, nationally advertised Mueller Climatrol name means more sales. And, by tying in with Mueller Climatrol they have a *complete line* of gas equipment — gravity furnaces, winter air conditioners, boilers, suspended unit heaters — as well as conversion burners.

Gas heat holds a great profit opportunity for you if you are set with a line people want to buy. That's why it will pay you to push Mueller Climatrol. Write for complete details — L. J. Mueller Furnace Co., 2010 W. Oklaboma Ave., Milwaukee 7, Wis.



D-101





Skaddle HUMIDIFIERS

FOR OIL OR GAS-FIRED FORCED WARM AIR

The answer to the humidity problem where plenum temperature is low. Skuttle Vapoglas Plates are being used by approximately 80% of the heating industry. 56 sq. in. per Vapoglas Plate exposed to heated blower air provides needed evaporation area for humidity. Single size Series 600 holes 5 to 20 plates—for jobs up to 180,000 BTU. Single model fits any bonnet. Self-flushing—self-cleaning.

FUEL ECONOMY— LONG LIFE

Skontal

WINDLASTER DRAFT CONTROL

Scientifically designed to do a better jab of craft control. Test chart shows a flat curve, assuring even, effective control—better operation at all draft values. Square housing and patented angle mounting provide larger effective area—more uniform opening.

Simple, sturdy construction enables you to offer your customer a better requiator for less money—at more profit to you.

5246

Your jobber stocks Humidifiers and Draft Controls.

MANUFACTURING COMPANY

4099 BEAUFAIT . DETROIT 7, MICH.
WRITE FOR DETAILS

AMERICAN ARTISAN, AUGUST, 1949

Skuttle

Why Pipe Heat All Over?



make it where it's used . . .

Why waste cash on costly distribution systems to pipe heat all over your plant? Dravo Counterflo Heaters make it right where it's used, blanket working areas of 4,000 to 20,000 sq. ft. per unit with production-stimulating warm air.

Counterflo Heaters also provide ventilating air in summer. 100-150-foot air throw; no ducts needed for large open areas. Oil or gasfired, readily converted. Reported total installed cost 50 to 66% less than wet-type systems. 80-85% efficiency. Only power, fuel and vent connections required for installation. Stainless steel combustion chamber, rugged mill-type construction, AGA approved and UL listed. Ask for Bulletin DE-523-4



DRAVO

CORPORATION
DRAVO BUILDING, PITTSBURGH 22, PA.

Drave also manufactures the DRAVO CRANE CAB COOLER for air conditioning hot-metal crane cabs.

PITTSBURGH • CLEVELAND • PHILADELPHIA • DETROIT • NEW YORK • CHICAGO • ATLANTA • BOSTON

Sales Representatives in Principal Cities. Mfd. and Sold in Canada by Marine Industries, Ltd., Sorel, Quebec.





7 miles of ducts are made of Kaiser Aluminum

When General Electric's new \$30,000,000 Turbine Plant at Schenectady, New York, is completed this year, it will be the world's largest. Here G.E. will produce turbine-generators with outputs ranging from 20,000 to 200,000 kilowatts.

Stone & Webster Engineering Corporation, Boston, built the mammoth plant, which has more than one million square feet of floor space, and "breathes" 150 million cubic feet of air an hour. Seven miles of ventilating ducts are made of Kaiser Aluminum.

Result: These advantages . . .

Greater thermal efficiency. Lightness, strength, lower installation costs. No coating to spall, no rusting — no maintenance problems!

A. J. Eckart, Inc., Albany, N. Y., heating, ventilating and piping contractors, found that four men could easily lift into place 40-foot sections of duct made of light, strong Kaiser Aluminum (left). If the same sections were made of galvanized, the weight would have been three times as great.



KAISER ALUMINUM is easy to fabricate. So Albany's United Roofing Co., the subcontractors on ventilating ducts, found fewer steps were needed in handling, trucking, storing and assembling sections—which meant lower installation costs.



TESTS HAVE PROVED ducts of Kaiser Aluminum have more thermal efficiency than ducts of other materials! In addition, there's no coating to spall and practically no maintenance. From now on, specify ducts made of Kaiser Aluminum!

Permanente Metals

PRODUCER OF

Kaiser Aluminum

SOLD BY PERMANENTE PRODUCTS COMPANY, KAISER BUILDING, OAKLAND 12, CALIFORNIA . . . WITH OFFICES IN: Atlanta · Boston · Chicago · Cincinnati · Cleveland · Dallas · Denver · Detroit · Houston · Indianapolis · Kansas City · Los Angeles Milwaukee · Minneapolis · New York · Oakland · Philadelphia · Portland, Ore. · Seattle · Spokane · St. Louis · Wichita EXPORT OFFICE, OAKLAND, CALIFORNIA · WAREHOUSE DISTRIBUTORS IN PRINCIPAL CITIES Copp. 1949. Permanente Metalo Corp.

Stiffere. of the future!



Now!...a worthy addition to the great WARM MORNING Line...a Package COAL FURNACE with many new, advanced features! A complete, compact packaged unit for quick, easy, low-cost installation. Does triple duty...serves as a gravity or pipeless furnace; a forced air furnace (with or without ducts) or as an all-purpose Space Heater.

WARM MÖRNING PACKAGE COAL FURNACE

• Heat output 80,000 B.T.U. at Bonnet • Exclusive, patented interior • Fuel capacity 100 lbs. • Cabinet finished in Beige Brown, Hammertone; feed and ash doors in aluminum • Built-in automatic heat regulator • Ball-bearing grates; heavy duty, draw center • Removable ash container — ½ bu. cap. • Blower adjustable for range of 800 to 1250 C. F. M. • Height 54"; width 28"; depth 36".

WRITE for Illustrated Folder giving detailed information on this New WARM MORNING FURNACE!

LOCKE STOVE COMPANY
114 West 11th St. Kansas City 6, Mo.



As a Pipeless Furnace
Basement Installation



As a Regular Furnace Utility Room Installation



As a Regular Furnace Basement Installation



As a Space Heater for Schools, Churches, Warehouses, etc.

TUF-1

Inexpensive smaller sheet metal machines built with the SAME PRECISION as large costly ones

BECAUSE smaller machines
such as foot-operated squarsuch as foot-operated squaring shears and hand-operated
slip roll formers, do a Lion's
slip roll formers, do a Lion's
whare of work in many sheet
share of work in with the
share of work in many sheet
share of work in many shee

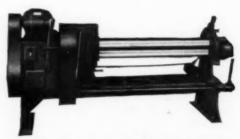
Jigs and fixtures are used in the machining and drilling in the machining and drilling of every part to insure accurate fit. On manually operated is caremachines, leverage is carefully balanced for operation fully balanced for operation with minimum effort. Each with minimum effort. Each carry a greater stress than carry a greater stress than required by any possible load. The carry and the

Through the operation of their own foundry and other production line economies, the initial cost of Wysong and Miles sheet metal machines is surprisingly low. Simplicity of design and precision in construction mean economical maintenance and operation. WRITE for CATALOG No. 22 giving full information on Wysong and Miles sheet metal machines . . . Power and foot-operated squaring shears, power and hand operated slip roll formers, and combination sheet metal machine.



NO. 552-A, CAPACITY 52", 12 GAUGE, MILD STEEL

For accurate cutting, holddown and knife-bar travel in hand-scraped slides. The perfect slide bearing prevents rocking or deflecting . . . Other power squaring shears in 10 foot, 10 gauge; 8 foot, 3/16", 10 and 12 gauge; 6 foot, 10, 12 and 14 gauge.



POWER SLIP ROLL FORMING MACHINES

5" rolls in 48", 60", 72", 96" and 120" lengths. Initial type rolls. All rolls are gear driven and maintain the proper mesh at any setting. To save steps, roll lifting and locking levers are together on right hand end of machine.



HAND OPERATED SLIP ROLL FORMERS

2" rolls in 30", 36" and 42" lengths, 2½" rolls in 36" and 42" lengths, 3" rolls in 48" lengths. Can be used as bench models or furnished with legs. Precision made throughout.



COMBINATION MACHINE

Furnished with interchangeable

rolls. This one machine is used for burring, turning, beading,

wiring, crimping, slitting, elbow edging and other operations. With special attachments it is

also used for circle cutting and

400 LINE OF FOOT-POWER SQUARING SHEARS

Capacities 36" through 52" in 16 and 18 gauge. Rugged and fast shears that cut accurately without twist or spring . . . Other foot shears in 8', 18 ga. with self-locking, hand-operated holddown. WYSONGand MILES CO

623 FULTON STREET GREENSBORO, N. C.

Sell the MODERN Kaustine Winter Air Conditioner Complete Packaged Unit Assembled at Factory FOR EASIER SALES... MORE PROFIT

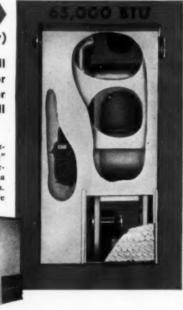
- Check the features of these two modern Kaustine Winter Air Conditioning Units. They are engineered to the needs of the small home owner... and made to order for your sales needs in today's competitive market. Their smart, modern appearance and features that are usually found only on higher priced units make them easy to sell. The ease and speed with which they can be installed means more profit for you on every installation. The satisfaction they give means more sales without sales effort on your part. Kaustine is the real profit line for Fall heating sales.
- BURNS THE TOUGH
 CATALYTICALLY CRACKED OILS

KAUSTINE PO65 "R" HB (High Boy)

For the utility room in the small home . . . for basement use, or as a pipeless furnace . . . for garages, gas stations, small shops.

65,000 BTU at the bonnet with .65 nozzle. Takes minimum floor space, $24\frac{1}{2}$ " wide by $31\frac{1}{2}$ " deep. Filters can be interchanged from right to left side in a minute and a half for easier installation. No cutting or patching. Chrome steel fire pot liner. 9" blower. Warm

air outlet 14"x23½". Economizer of improved streamline design extracts extra heat from flue gases. "Air Way" designed combustion chamber. 6" flue stack.





The oil-fired Air Furnace "Designed" for Today's Homes.

95,000 BTU at bonnet with .85 nozzle. Floor space 24½" wide by 49¾" deep. Only 46" high. 20" by 24" air filter. 10" Chrome steel firepot. 9" blower. Cold air inlet and warm air outlet located in top of furnace casing, each 18" wide by 15" long. Large float type pan humidifier. Has Economizer and "Air Way" combustion chamber. 6" flue stack.

Send for your supply of this helpful home-owners book— "How to Choose a Winter Air Conditioning System,"



BACKED BY NATIONAL ADVERTISING
...BY MORE THAN 34 YEARS SERVICE
TO THE AMERICAN HOME OWNER



MODULATING WARM AIR FURNACES . . . SEPTIC TANKS . . . SEPTIC SEWAGE DISPOSAL EQUIPMENT . . . METAL TILE CONNECTORS . . . OIL AND GASOLINE STORAGE TANKS . . . HYDRO-PNEUMATIC AND WATER STORAGE TANKS . . . PRESSURE VESSELS . . . TRUCK TANKS . . . CUSTOM BUILT FABRICATED EQUIPMENT . . . TRANSFER PUMPS

tooking for a

HOT ITEM

to steam up your salesmen?

Turn them loose on

PANELOX®

STAINLESS STEEL
COMBUSTION CHAMBERS

Installed in Minutes
Heats up in Seconds
Stands up for Years

Here are three sound, solid reasons why it pays to push PANELOX Heat-resistant Stainless Steel Combustion Chambers now—

- No home owner wants to pass up fuel savings of 10% to 25%—proved possible with PANELOX.
- No housewifewants to turn down cleaner, quieter heat—assured with PANELOX.
- You can't afford to miss out on the sales and profits PANELOX offers.

Right now there's a real demand for a sure-fire fuel saver. PANELOX is it—as proved in thousands of installations.

So get all the facts about this sensational, tested and proved development in stainless steel combustion chambers. Write, phone or wire for full details, prices and dealer proposition today.



Easy to install. No backfill, no cementing, no tools, no need to remove old chamber.



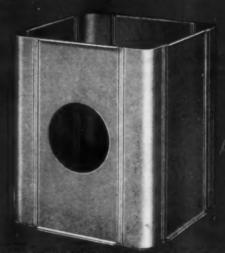
Four thicknesses of metal at interlocked seams—provides extra strength, rigidity.



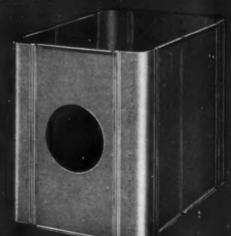
Panels made in several widths for easy fitting to a wide range of chamber dimensions.



ROUND. "A" SERIES. New design! New flat port panel for easier sealing of burner gun reinforced with top and bottom flange. Seams strengthened to prevent warping.



SQUARE. "S" SERIES. Reinforcing flange on flat panels. Rounded corner panels permit perfect flame pattern.



RECTANGULAR, "R" SERIES. Provides more combustion area in narrow fireboxes. Easy to fit any size or shape firebox.

STEFCO STEEL COMBAN

HEATING EQUIPMENT DIVISION . MICHIGAN CITY, INDIANA



cut inventory investment - job time - material costs

Why make your own pipe and fittings, when the complete Mueller Climatrol line offers so many advantages? You can concentrate your man-hours on profitable installations, handle each job faster, more jobs per season. And you don't have to worry about complicated estimates, uncertain costs, and "tricky" balancing!

Complete stocks of every fitting you'll need are available at all times. Absolute uniformity assures quick erection and neat, compact jobs. CHECK these time- and money-saving advantages of Mueller Climatrol patented fittings:

- ✓ Patented take-off reduces trunk-size from 6 to 10 inches at plenum on average installation.
- ✓ Smaller trunk size cuts job time, material costs makes balancing fast and simple.
- ✓ Eliminate need for increasers, and other extra fittings.
- √ "Standardized" costs increase your profits.
- ✓ Conform to simplified practice recommendations of U. S. Bureau of Standards.
- ✔ Also a complete line of duct and fittings for extended plenum systems.



	augus Climatral	Tear out this coupon and mail today! Ask your jobber!
Just		L. J. Mueller Furnace Company 2010 W. Oklahoma Avenue, Milwaukee 4, Wisconsin Rush a copy of your new Furnace Pipe and Fittings Catalog.
off	FURNACE PIPE, DUCT AND	Name
the	FITTINGS	Company Address
press	LJ MUSTICES PLANAGE OF	-City-() State-



don't want a Big Inventory!



Then you need the CHAR-GALE SYSTEM

Q. What do you mean?

- Figure your present needs for galvanized and aluminum fittings, ducts, pipe and elbow—registers and humidifiers—and galvanized and aluminum sheets. Then get it all in one cost-saving shipment from CHAR-GALE!
- But I can't afford L.C.L. shipments.
- A. No need to. You're ordering a mixed truckload. Therefore you're getting the truckload discount on each and every item which makes up that truckload! That means extra-saving and extra-profit through lower unit costs. . . less storage . . . and reduced dollar investment. It means increased efficiency to you!
- That does sound good. Are all those products you mentioned made by CHAR-GALF?
- A. That's right. And you get fast delivery
 ... in flawless condition ... right to
 your door.

That's for me! From now on I'm going to keep inventory down . . . and profits up with the CHAR-GALE Combination Truck Shipments.

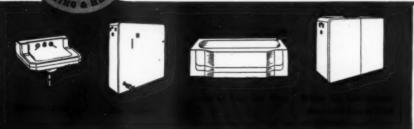
CHAR-GALE Manufacturing Co.
MINNEAPOLIS OMAHA





RICHMOND

RICHMOND RADIATOR CO .- AFFILIATE OF REYNOLDS METALS CO.



See	VOUE	wholespler	or MAIL	COUPON	TODAY

AA-8

Richmond Radiator Company 19 East 47th Street, New York 17, N. Y.

Please send me complete information and illustrated folder on the new twin unit Richmond Gas Winter Air Conditioners.

Address

A NEW WARM AIR CONDITIONER

in a complete new line by

(July Singer

THE SENSATIONAL 100,000 BTU UNIT

Here's the first of a new line of Gilbarco oil-fired heating equipment. A modern, high-efficiency warm air conditioning unit—trim and compact in design, with rounded corners and two-color "Hammertone" finish for attractive appearance . . . And the easiest and fastest on the market to install and service!

THESE IMPORTANT POINTS FOR DEALERS

- Lower Installation Costs—can be installed in far less time than any other comparable warm air conditioner
- Simple to Service—entire front vestibule instantly removable provides free access to burner on all sides
- Burner has all the easy service features of the new Gilbarco GCN model

DEALERS! DON'T MISS THIS CHANCE:

For new customers and bigger profits write for full information on the new Gilbarco Oil-Fired Warm Air Line.

THE OIL BURNER WITH THE ECONOMY CLUTCH Gilbert & Barker Mfg. Co. West Springfield, Mass.

Toronto, Canada
CONVERSION AND REPLACEMENT BURNERS
BOILER BURNER UNITS . WARM AIR CONDITIONERS
INDUSTRIAL BURNERS

Engineered for <u>Fuel-Saving</u> <u>Economy</u>, Trouble-Free Operation Counterflow Al Movement for high, uniform heat transfer More air-heating surface for greater effi- High-quality chrome steel combustion chamber factory-sized and installed the famous Economy Clutch—an exclusive Gilbarco fuel-saving

WORLD'S FINEST REGISTER"

Eliminates Quadrant Dampers . . . Lets Homeowner Balance His Own Heating System!

ONE MAN can balance a heating system using this revolutionary register, in less time than two or more men with conventional registers! The exclusive Lima "Balancing Bell" control makes this heating miracle possible. No quadrant dampers are needed. The homeowner can readjust the system to suit his needs, without ever having to call in for service! New manufacturing processes enable you to install this new register at competitive prices, too! Send TODAY for free descriptive brochure!

> PIANO TYPE STEEL SPRINGS Strong and durable. Afford perfect

valve control.

"Balancing Bell" CONTROL

Perfect finger-tip heat control. Does work of quadrant valves.

SPONGE-RUBBER SEALED

Gives absolute sealing when set in place.

Electrostatically PAINTED

Finest finishing method known. Paint clings to all parts.

SMOOTH ONE-PIECE HORIZONTAL LOUVERS

Streamlined appearance. No center band to resist air flow

ORDERS FILLED COMPLETELY FROM STOCK WITHIN 5 DAYS OR LESS!

HIDDEN RESISTANCE-WELDED VERTICAL BLADES

Give perfect air diffusion, eliminate drafts.

HEAVILY DIE-FORMED VALVE

Closes tightly, never leaks, never tles."

THE



REGISTER COMPANY

LIMA, OHIO

SEND COUPON TODAY For FREE Descriptive Brochure!

LIMA REGISTER COMPANY 651 N. Baxter Street, Lima, Ohio

Gentlemen: Please send me free descriptive brochure on the complete line of Lima regis-ters and faces for installation in walls, baseboards and floors.

_ZONE___

NAME -

ADDRESS_

STATE

"BRYANT Winter Air Conditioning provides Customer Comfort AT LOW COST"



says A. Wilner, Owner-Operator, Western Auto Associate Store, Somerville, N. J.



"Bryant Winter Air Conditioning does a very highly satisfactory job in our store... warms, filters, humidifies and circulates the air to provide comfort for customers and employees alike. We are happy to recommend Bryant Automatic Heating."

Bryant Model BA-88 Winter Air Conditioning installation in Western Auto Associate Store delivers warm air to the store through overhead supply outlets. Return air is removed from the store at several points along the floor line. Heating contractors: Elling Bros., Somerville, N. J.

You can get a full share of the warm-air heating business in your area with the Bryant Model BA-88 Gas-Fired Winter Air Conditioner. The BA-88 has a place in the forced warm-air systems of all types of homes and helps create ideal indoor weather in offices, stores and other commercial applications.

These Bryant-engineered features set the BA-88 apart from ordinary warm-air equipment: All cast iron tubular heat exchanger for years and years of superior service and high operating efficiency; rugged cast iron burners with raised, *precision-drilled* ports (specifically drilled for the type of gas to be burned, whether it be natural, manufactured, LP or mixed gas); and the famous Bryant Diaphragm Valve and Automatic Pilot.

The Bryant Model BA-88 Winter Air Conditioner is fully enclosed in its sturdy steel jacket, requires a minimum of floor space for equipment of its type. It is made in seven standard sizes, with inputs from 60,000 to 250,000 Btu per hour.





BRYANT HEATER DIVISION
Affiliated Gas Equipment, Inc.
Cleveland, Ohlo • Tylor, Toxas

THE MOST COMPLETE LINE OF GAS HEATING EQUIPMENT IN THE NATION

For fractional horsepower motors come to headquarters!



Our entire motor-building facilities are devoted to the production of fractionals. Our entire motor-building experience—experience which spans 33 years—has been in the fractional horsepower motor field.

And so we feel we are entitled to designate our fractional-horsepower motor-building operations as "head-quarters"... and to write "specialists" after our name.

If your fractional motor requirements call for quality in quantity, we will be glad to have our engineers consult with you.



Packard Electric Division, General Motors Corporation Warren, Ohio

ORS FOR THIRTY-THREE YEARS

MOTORS fo

The long and short of it is...

FLUID HEAT FITS EVERY) CUSTOMER

BIG SELECTION OF MODELS HELPS YOU SATISFY MORE PEOPLE, MAKE MORE SALES!

Small homes, average homes, large homes-warm air, hot water, steam—whatever a prospect's heating requirements, you can fill his needs and fit his pocketbook with Fluid Heat! Continued research and modification by Fluid Heat's development laboratory keep Fluid Heat equipment up to the minute. Keep you ahead of competition. Insure smoothrunning burners, capable of handling any domestic fuel oil. Minimize costly service problems and make every buyer a satisfied customer. For further information on the Fluid Heat Oil Burner line, most complete in the industry, write today to: FLUID HEAT OIL BURNER DIVISION, ANCHOR POST PRODUCTS INC., 6720 Eastern Ave., Baltimore 24, Maryland.

"WORLD'S ECONOMY CHAMPION"

Manufactured by Anchor Post Products, Inc. Baltimore 24, Md. Established 1892



Units from 475 to tary Burners with 840 sq. ft. of standing



Boiler Burner 2 Wall Flame Rofiring rates from 1/2 to 41/2 gals. per hour.



4 Pressure Burners with firing rates from 7/10 to 12 gallons



7 Air-Conditioning Furnaces from 65,000 to 200,000 B. T. U. per hour.

For Any Fuel-Oil Pump Requirement Check
the Advantages of
the New (H)
OILIFTER

The new A-P OILIFTER builds up your reputation by the job it does for your customers. It gives you many exclusive advantages, including:

- Time saving on installations of rotarytype oil furnaces or conversion units.
- DEPENDABLE feeding of rotary-type burners or vaporizing-type burners.
- Pumps No. 1, 2 or 3 fuel oil as needed.
- No radio interference, pump or motor noise.
- Feed rating: 3 gallons an hour at 10 feet.

- Lifts oil 25 feet or propels it horizontally up to 100 feet.
- U-L listed as standard. It's fail-safe. The motor can't overheat and there's an extra safety float to stop oil flow if the regular operating float should stick.
- Inexpensive and easily installed. Only one ¼" copper tubing necessary from tank to pump.





DEPENDABLE

Oil Controls
DESIGNED TO ELIMINATE SERVICING

AUTOMATIC I	PRODUCTS	COMPANY
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2452 N. Thirty-Second Street, Milwaukee 10, Wisconsin

Send all details about Model 346 A-P OILIFTER.

NAME....

ADDRESS

CITY.....STATE.....

Signed by.....

Our Jobber....

AUTOMATIC DRIP HUMIDIFIERS



Vaporite Humidifiers may be installed either above bonnet or with the pan resting on the bonnet.

Vaporite Automatic Drip Humidifiers are made for tailored fitting. Attach easily to all types of high furnaces. All accessories are included in one kit with nothing extra to buy.

Your furnace will receive more enthusiastic response from value-wise customers when you install Vaporite Automatic Drip Humidifiers. They know the advantages of Automatic's bi-metal, fool-proof thermostat—the fingertip control, the long-lasting stainless steel pans. All these advantages and more add up to additional years of trouble-free service. That's why hundreds of thousands of Vaporite Humidifiers are in use now as regular equipment.

Unbeatable Performance Features

- Air tight valve.
 No clogging.
 Pan easy to clean.
- No electrolytic action.
 Valve movement prevents clogging by lime.
- Fingertip adjustment for more or less humidity.

Write Today

for FREE literature including prices, deliveries and discounts on the amazing new Vaporite Automatic Drip Humidifiers.

Dept. A-8

- No stagnant pool of water left in pan.
- Hot pan surface gives immediate vaporization.
- Stainless steel pan heats fast.
- Easy to install fits all types of high furnaces.

Automatic

HUMIDIFIER CO

· GEDAR FALLS, IOWA



HI-BOY

WINTER AIR CONDITIONER



A COMPLETE PACKAGE UNIT

At last—an oil burning furnace that is completely assembled at the factory before shipment! No need for

complicated assembly instruction—no chance of error in construction. The Certifled HI-BOY, a winter air conditioner designed on the counterflow principle of pre-heated air, is completely assembled . . . arrives at the building site in a crate just like a new refrigerator.

EASY INSTALLATION

... EASY SERVICING

Connection of fuel and power lines and the thermostat completes the field installation.

Oil burner and controls are readily accessible for servicing by removal of upper front panel on the furnace front. Fan and motor are mounted on rails which permit the entire unit to be removed as easily as sliding the tray from an oven.

ADAPTABLE TO CONVENTIONAL OR BASEMENTLESS HOMES

Supply and return ducts enter the furnace at the top. With this feature, the HI-BOY takes up a minimum of floor space. Basement or utility room is uncluttered. No air ducts are near the floor to hamper cleaning or to take up valuable space. The perfect winter air conditioning unit for conventional or basementless small homes—the new Certified HI-BOY.

For further information on the Certified HI-BOY write now for Certified Bulletin No. 902-C

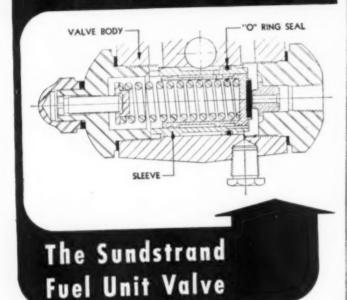


CERTIFIED FURNACE COMPANY

DIVISION OF STAINLESS AND STEEL PRODUCTS COMPANY

1000 BERRY AVENUE . ST. PAUL 4, MINNESOTA

Designed for Better Performance and Simplified Field Service...



Here's the balanced valve that provides quick, clean cut-off and uniform pressure in all Sundstrand Fuel Units. Its basic design features improve performance while facilitating servicing in the field.

An "O" ring under compression provides a positive seal between the sleeve and body. With this construction, the complete valve assembly can be replaced without removing the unit from the burner, a very important factor for easy field servicing.

Quick, clean cut-off and uniform pressure are other features of the Sundstrand pressure regulating valve. To obtain uniform pressure regulation (free from pulsation) and instantaneous cut-off, all pressure binding has been eliminated. Three by-pass ports, equally spaced around the outside of the piston, equally distribute pressure relief so that any eccentric load on the piston is eliminated. Thus, it's a balanced valve and free from pulsation even when the pump is operated on high lifts or long lines.

MINISTER STATE

FREE ADITIONAL DATA — This booklet will give you more complete details on the Sundstrand line. Use it for a handy reference on those unusual jobs that come up now and then. Write for your copy today. Ask for Bulletin No. A-44. NOTE: Sundstrand Fuel Units are being manufactured in Canada by John Inglis, Ltd., 14 Strachen Avenue, Toronto, Canada.

Fuel Units for All Types of Burners



S1-B — Most popular unit for domestic oil burners. Entire capacity of pumping members is 21 GPH. Maximum nozzle capacity of either 4½ or 6 GPH depending upon strainer rating.



51-H — Has maximum nozzle and strainer capacity of 13 GPH. Entire capacity of pumping members is 27 GPH.



\$1-J—Used on oil burners with main line filtering means of capacity equal to or greater than maximum capacity of burner. Maximum nozzle capacity is 20 GPH. Entire capacity of pumping members is 35 GPH.



S-2 — Two-stage pump with strainer has maximum nozzle capacity of 6 GPH. Entire capacity of pumping members is 18 GPH. Used on "two-pipe" system for either outside or inside installations where vacuum requirements are not more than 15 inches.



Model R—Two stage unit suitable for vacuum requirements up to 25 inches. These units are self-purging and recommended for two line installations where unusually long suction lines and high lifts are required. Available in either 6 or 10 GPH nozzle and strainer capacities. Entire capacity of pumping members is 18 and 21 GPH respectively.



L1 — For small oil burners and water heaters. Has nozzle capacity of 2 GPH, has 25 watt power consumption, and when operated at 1725 RPM provides pumping capacity of 6 GPH. Recommended for gravity feed installations only.



1-OB Series — Pumps without strainer and regulating valve. Made in 3 sizes of 21, 27 and 35 GPH.



SOLENOID OPERATED UNITS FOR FAST CUT-OFF

They provide instantaneous cutoff on high resistance type furnaces and eliminate an unbalanced air-oil condition upon shut-down. Prevents "flutter" and "puff-back" in combustion area and produces absolute clean burning.

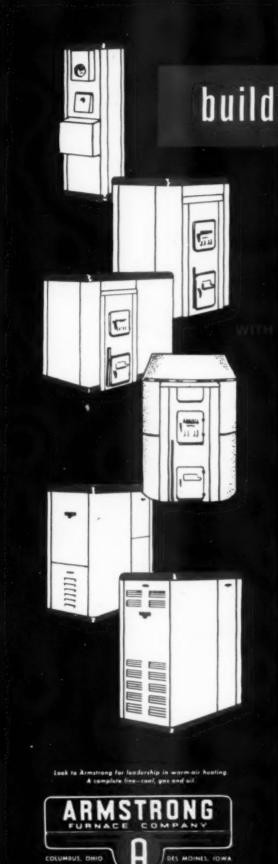


SUNDSTRAND H

ROCKFORD, ILLINOIS

DRAULIC DIVISION

FUEL UNITS . HYDRAULIC PUMPS . TRANSMISSIONS . FLUID MOTORS . VALVES and CONTROLS



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Sales Profits

ARMSTRONG'S COMPLETE FURNACE LINE

A UNIT FOR EVERY NEED OR PREFERENCE

Armstrong offers 54 models and sizes of warm air heating equipment, from 57,000 to 700,000 BTU. There are units for coal, units for gas, units for oil—hi-boys and basement models—forced-air and gravity. It's a complete furnace line, with a unit for every warm air heating need or preference.

PROTECTED PROFIT MARGIN

Armstrong furnaces carry a good margin of profit, and Armstrong protects your profit by providing you with equipment which has been designed, engineered and manufactured to give completely satisfactory service. Few service calls — pleased customers — higher profits.

MERCHANDISING ASSISTANCE

To help you build your sales and profits, Armstrong offers you a complete merchandising program, including publicity stories, prepared newspaper advertisements, handbills and doorhangers, direct mail material, and complete advice and prepared scripts for radio, telephone solicitation and house-to-house canvassing. It's complete in every detail. It will help you sell heating equipment.

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Armstrong heating equipment is distributed to the installing dealer through authorized Armstrong jobbers, who have been carefully selected for their ability to provide proper facilities for effective service to dealers. Send in the coupon for additional information about an Armstrong connection in your territory.

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CONCO heat

GAS LINE

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Completely new, fully automatic. Filters, circulates, warms and humidifies the air, providing complete heating comfort. In sizes from 81,250 to 155,000 BTU per hour input. A.G.A. approved for use with natural, manufactured, or mixed gases, or liquified petroleum gases.

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8] C: 7

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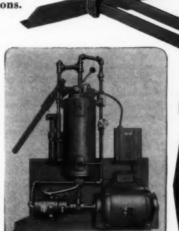
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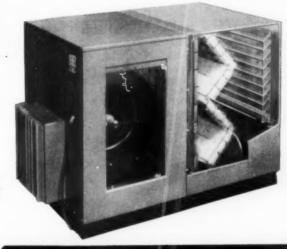
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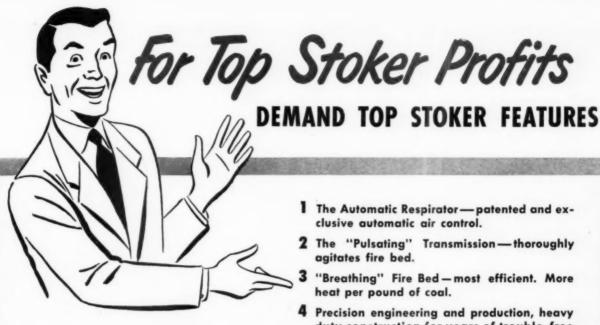
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Steel Faces Welfare Issue

THE THREATENED STEEL STRIKE was averted only a few hours before the scheduled walkout at 12:01 a. m. July 16. Some mills had already started to bank furnaces and suspend operations as the deadline came uncomfortably near. Postponement came after several days of public suspense over an anticipated disruption of the nation's faltering economy. President Truman had proposed that he appoint a fact finding board to study the steel dispute and recommend terms of settlement, although the latter would not be binding on either party. The national sigh of relief that followed the steel industry's acceptance of this proposal was a normal public reaction to deliverance from threatened national chaos. But there is little evidence to show that the public was aware or informed about the deep-seated and far-reaching issues in dispute.

Involved are a fourth round wage increase, social insurance, and pensions—cradle-to-grave welfare. The outcome of this dispute is expected to become the pattern for welfare demands upon employers of union labor across the country. Its implications were lost in emotional climax when, in the terms of the press, steel "capitulated."

The verbal drama that preceded acceptance of the President's proposal of intervention developed into a play on words. What constituted acceptance or rejection and what was accepted or rejected? The fact that a truce was accepted, the fact that the strike was only postponed for 60 days, and the fact that there was no justification for wage increases at a time when business volume is receding and prices declining were lost to the public as the drama unfolded. Anticipation of the board's ultimate findings and recommendations and the circumstances of steel's final acceptance have already set the stage for the weight of public opinion in favor of granting concessions to the steel workers.

Statements emanating from steel companies, replying to the President's proposal, were similar, asking that he follow the Labor Management Relations Act. The act provides for such a board, but without authority to recommend to the parties in a labor dispute the terms of settlement. Benjamin F. Fairless, president of U. S. Steel Corporation, on July 12 sent a telegram to the President stating, "We are unwilling to go outside that statute (LMRA), as you propose, and accept a board with power to make

recommendations to the parties as to the terms of settlement."

On July 14, Mr. Fairless wired: "As we understand your second telegram, it is your belief that the strike now threatened . . . does not constitute . . . immediate peril to the national health and safety . . . we are unable to see why it is necessary to appoint outside of that statute a fact finding board having greater powers than a . . . board appointed in accordance with the provisions of such Federal labor statute in a situation involving immediate peril to the national health and safety.

"You have stated in your two telegrams . . . the board which you contemplate appointing will make recommendations . . . We respectfully ask that you advise us if you are willing to modify your proposal so that the proposed board will expressly be limited to fact finding."

Friday afternoon, several hours before the impending strike, Mr. Fairless wired the President:

"This morning Cyrus Ching, Director of Federal Mediation, advised me in reply to my telegram of July 14 to you that you are unwilling to adopt our request that the powers of the proposed board...be expressly limited to fact finding.

"Nevertheless, we will appear before that board . . . upon the basis stated in your first telegram to me that work and operations in our plants are to continue under the terms of the collective bargaining agreement now in effect for a period of 60 days from July 16, 1949. We do this upon the understanding, set forth in your second telegram to me, that the recommendations of this board will not bind either party."

It is apparent from the foregoing that the President's proposal did not stipulate that the recommendations of the board would be binding on either of the parties and that acceptance did not constitute acceptance of the board's recommendations. It is also apparent that the President decided to disregard provisions in LMRA for settling a dispute affecting the national welfare. The actual course of the events seems to be a far-cry from "bowing" and being as "submissive as sheep" as some press dispatches and columnists portrayed it. Of course it can be said that facts make their own recommendations, but not in this day of political bias and prejudice. A board in sympathy with either party is too apt to recommend in accordance with its sympathies.



ORE deficit financing, printing more money-an-M ORE dencit financing, printing of the order dencit financing, printing of the order dencit financing, printing of the order of the or inflation—is the pattern of the plan presumed to be in the mind of the administration to offset the current business slump. The program is expected to come into play the last half of this year. The administration expects business to do its share by lowering prices, profits, and everything else that will permit business to function prosperously. Profits during the next six months will be scrutinized with a microscope. As a concomitant for the good things it is presumably doing for the national economy, the administration will forego the increase in taxation which has been part of the Fair Deal program. If the big corporations are reluctant to play ball, it is quite possible that the administration and Congress will soak them with added taxes. If the economy as a whole does not accept this program, government is expected to move in and take control over prices, profits, wages, and every controllable activity that makes the economy tick. In other words, either you accept the program as outlined or you go into a completely controlled sociopolitical economy.

Legislative Program Beaten

The Fair Deal legislative program has of course been completely wrecked. Very little of the original program is expected to be enacted this session. Congress fervently hopes to get out of this stewing atmosphere of Washington not later than August 10. The President also hopes that they will get out of the stewing political atmosphere of Washington by August 10. He wants to be free to shape foreign affairs without interference from Taft, Vandenberg, Connally, Dulles, and the rest of the prima donnas in the Senate. As you may know, the President uses Dean Acheson as a client uses a lawyer. The Secretary of State is more of a rubber stamp than a free individual functionary of the government. When Congress leaves here we are apt to see some strange and interesting phenomena of foreign policy.

It is expected that during this session the Fair Deal legislative program will give us an increase in the wage-hour law from the present 40 cents an hour to 65 cents an hour minimum wage. The White House is said to be willing to settle for that without expansions of the pattern for the time being. But in the next session, the administration is expected to insist upon all the expansions demanded in the Lesinsky bill as

well as the increase of the minimum wage to 75 cents an hour or possibly even a dollar an hour. We are also bound to have a complete revival of the effort to put over the substitute for the Taft-Hartley law. Welfare legislation will come up in complete detail including every phase that has been discussed. The Brannan suggestion to give direct support to the farmers will unquestionably be brought to the front. During the present period, the backers of the Brannan program will be satisfied with the Aiken price support law. The most successful Fair Deal legislative effort has, of course, been the public housing law, passed early in July.

The New Housing Bill

This correspondent regards the public housing law as an historic incident that parallels Caesar's crossing of the Rubicon. It is the first decisive and definite legislative action to change the actual character of this nation politically, socially, and economically, from the democracy which was created in 1776 to the kind of state that was created by Hitler and by the British with the advent of Attlee, Bevin, and Cripps. If you examine the present trend of the British government you will recognize that it absolutely parallels the progressive development of the Nazi state under Hitler, with the sole exception that the British are not so crazily and violently anti-Semitic. You will recall that despite the billions we have poured upon them for their relief, they are acting contrary to our interests by setting up barter arrangements for billions in value with Russia, with the Argentine, and with other nations. The chief functional difference is that Schacht, the German financial wizard, was extremely clever in his arrangements while Cripps is just stupid. The present situation in Britain is proof enough of British inadequacy.

Public Housing in Britain

Our public housing program, of course, is just another version of the British public housing program. In these letters during the past months, this correspondent has outlined what the British housing program has done to the British economy—how it has killed competition, slowed up work and production, made life a burden to those who needed repairs, rehabilitation and new housing, and caused tremendous deterioration in the character of workers. Our housing program involves the expenditure of \$10 billion to \$12

Washington Letter



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billion during the next six years in 65 cities which are ready with plans to build 400,000 units. This is practically half of the units authorized. As you will recall, Congress has authorized 810,000 units. Also, the law authorizes the expenditure of \$1.5 billion for slum clearance, \$262.5 million for rehabilitation and building of farm housing, and an unspecified amount for technical and economic research. It is roughly estimated that the public housing venture will cost us somewhere between \$15 billion and \$21 billion to be paid off in 40 years. Actually no one knows how much it will cost.

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Unit Cost and Rentals

The average cost per unit of housing will run between \$5,000 and \$12,000. Rents will not be based on the size of a family or the cost of maintenance but upon the income of a family. It is estimated it will cost families between \$10 and \$55 a month for rent. The lowest rates will be in the Southwest and in the South; the highest rentals are expected to be in the industrial Northeast. The people who will live in the \$10,000 units will pay from 30 to 80 per cent lower rent than those who live in comparable dwellings privately built and owned.

All but six states have laws permitting local public housing authorities to proceed; the six states are Utah, Iowa, Oklahoma, Wyoming, Kansas, and South Dakota. Idaho, North Dakota, Maine, New Hampshire, and Vermont have virtually no permissive laws. We have now about 500 local authorities which have had some experience in public housing or wartime housing. There are 200 additional groups which have been organized but have no experience.

The future fight against public housing is expected to be focused in states and in communities which require legal validation in order to take advantage of the public housing law. While most of the funds for projects will be furnished by the Federal government, a minor part must be supplied as an earnest either by the state, the city, the county, or some other political subdivision. Presumably the original contribution from the Federal government will be a loan; actually most of it will be what is called a grant but is actually a gift. You will readily see that what is happening is that all of the taxpayers are helping to pay the rent for those who can not pay all the rent themselves.

The administration of the public housing law comes under the direction of Raymond Foley, head of the Housing and Home Finance Agency. Under this agency comes the United States Public Housing Authority, which will have direct supervision over the execution of the terms of the law. It will apportion the funds to local housing authorities. Each community is expected to make a contribution, as has been already noted. If it does not make a direct financial contribution, it may qualify by exempting the public housing project from local taxes.

Slum-clearance presumably is designed to eliminate shacks and tenements and substitute either modern new dwellings or, in some cases, parks or playgrounds, or some similar patch of delight. Municipal associations foresee a sudden and extensive development of city parks, boulevards, and playgrounds. Many skeptical persons anticipate that the hitherto undeveloped properties on the outskirts of towns and cities will become successors to slum clearance areas. The whole program probably will be much clearer within the next 30 days. It is anticipated that the Housing and Home Finance Agency will do its utmost to use the program as part of the stimulant to lift business from its present doldrums. Its effect is expected to be reflected in every part of the national economy.

Statement of Housing Head

Mr. Foley recently said, "The main effort now will be to get the provisions of this act in operation at the earliest practicable date. We have already done much preparatory study and organizational planning. Prompt recommendations will be made to the budget bureau and it is expected that Congress will furnish the necessary funds before it leaves in August.

"We expect to make a more rapid start on the public housing provisions than on the entire new program of slum clearance. We expect a significant number of low rent units will be under construction throughout the country in the next 12 months.

"The slum clearance program will require an entirely new set-up at the Federal level and will entail extensive local planning, organization, and local or state legislation. There are at the present time 24 states with basic legislation which authorizes participation under Title I. There are already a number of important cities able to complete specific project plans and enter slum clearance agreements within the next 12 months.

(Please turn to page 158)

Simplified Bookkeeping System For Heating & Sheet Metal Contractors

PART THREE

ARTHUR ROBERTS Pompton Lakes, New Jersey

Here is an explanation of the way in which job cost records can be kept as well as information on how to use these records. The author strongly emphasizes the importance of knowing whether each job being handled is earning a profit. If the contractor is able to tell soon enough that he is losing on a job he may be able to stop the loss.

A N Indoor Comfort dealer forced to choose between keeping financial accounts, recording income and outgo, and job cost records, which show the actual cost of each job, should choose job costing, yet, more Indoor Comfort dealers keep financial accounts than job cost records. Without the latter, the contractor has no means of knowing how or why he made the profit or suffered the loss shown on his profit and loss statement. He does now know the specific figures on labor, on sub-contracting, on materials or on miscellaneous costs directly chargeable to specific jobs, such as permits, bond or inspection fees. Sometimes these direct job costs hold the answer to the profit or loss on a job.

Like financial accounts, job cost records are flexible, but they vary far more in layout. They may be tied in with the financial accounts or kept separately. The contractor with a moderate volume will simplify recording if he keeps them separate. The basic purpose is to record the time, materials, overhead expense and direct job costs, then this over-all cost is compared with the selling price to determine the profit or loss on a job.

Purpose of Costing

Not only do the forms vary in layout, but the handling procedure varies in different shops, even those of moderately-sized businesses. If you keep in mind that the purpose of job costing is to record the time, materials and overhead expense per job plus the direct job expense, and if you get these figures on one record accurately, the form you use or the procedure doesn't matter so much. Adopt the form and procedure most satisfactory to your requirements, one which keeps paper work at minimum, yet, provides accuracy.

Fig. 1 is a job cost record, giving a summary of

all costs on a job. The materials used and the hours worked are filled in and costed in the office. A copy of the job record is given the workman, the original is kept in the office after the work description has been entered. Some contractors permit the workman to fill in the time spent on the job and the materials used, others use daily or weekly time cards and transfer the time to the office record for use in the final billing and cost analysis. They may enter the materials on a copy of the work order or instruct the workman to charge up the materials when the job is finished and then cost them in the office. If materials are brought back from the job, some contractors instruct their workmen to use the back of the job record to list the items.

One Form May Suffice

Many contractors can use this one form for costing. It contains all the elements for accurate costing, the work to be done, the estimate, the description of the work done, the materials used, the time spent on the job, the direct expense, the owner's or tenant approval, and provision for computing the overhead expense on the job. How to arrive at this calculation has been covered in American Artisan in other issues. This is outside the scope of this article, which is designed to show only the costing routine.

This job record may be filed alphabetically or serially according to job number. These forms are the basis of your experience figures, which enable you to estimate on subsequent jobs with maximum accuracy. Job costs are of limited use unless you use them later as guides to cost control. Some contractors who keep job records forget this important fact. You keep these records to find out how or why you gained or lost on a specific job and to provide experience figures so that

Job Cost Record

Name Location	Date	Address	ob No.	
	Work to l	be done		

Materials estimated			Materials used	
,				
Totals				
Labor estimated		Date	Labor on job Workman	Hours
m-4-1-				<u> </u>
Totals				
Recap of estimate		Labor	cap of completed jo	b \$
	\$	Materials		φ
Materials		Job expense		
Job expense		Overhead	1	
Overhead		Over-all cost		
Over-all cost	***********	Selling price		
Selling price.	*******		job	*************
Estimated profit on job		Variance		
	Ab	ove work O.K.		
	Sig	med		
			Owner or tenant	

Fig. 1 This is a comprehensive job costing form which should meet the needs of most contractors. It provides for the recording of all figures on a job, including the profit or loss. Any of the optional forms shown with this article can also be used, avoiding any duplication of information.

you can estimate jobs for maximum profit in the future.

Contractors doing a larger volume use a costing system basically the same and the figures are finally summarized on a job record in the office. The system used requires more paper work, the materials are listed on special sheets and must be signed for by the workman or foreman, special forms are used for recording the time, estimates are prepared on special sheets. The information on these forms is summarized on the office job record and then all the papers pertaining to the job, including those of sub-contractors employed, are

put in a job envelope and filed away or they are filed in a regular filing folder. Every contractor should keep all the papers pertaining to a job together. Usually he can fasten them to the job costing record. If you want to use a job costing envelope, we show one here. (Fig. 5)

If the reader should care to use a special estimate form, we refer him to Fig. 3. Where considerable sheet metal work is done, some contractors find it advisable to break down their estimates to ductwork, short angle cost, long angle cost, angle and ell cost, box cost, register cost, basement labor, stack labor, calling this the

Time Card

Kind of work done	Start	Stop	Hours	Rate	Amoun
	Kind of work done	Kind of work done Start	Kind of work done Start Stop	Kind of work done Start Stop Hours	Kind of work done Start Stop Hours Rate

Fig. 2 A standard form of time card which can be used on any job, the time charges being transferred to the job cost record. If the workman fills in his time on the job record this card can be eliminated.

total cost, labor and materials, on ductwork. The advantage here is that one can track down a loss on a sizable job to the exact source.

Where a job entails a number of different operations it is often wise to break down your figures to operations and compare estimated with actual costs on each operation.

Estimate Sheet

Name		Date				
Address		Job No.				
Location jo	b	Phone				
Units or hours	Description	Estimated cost	Actual cost			
1		1 1				

Fig. 3 If a contractor wishes to use a separate sheet for estimating this is a simple type to use. The information contained on this sheet can be omitted from Fig. 1

The time card or time slip may be a daily or weekly record (Fig. 2) or the workman can record the time on his copy of the job record. Lost time accounts for a lot of lost money in this business. For this reason, you should have some way to determine whether all the time you pay for has been put on jobs, and if not, why. The easiest way to do this is to check the time you pay for from your payroll records against the time reported on jobs for the same period. The difference is idle time or non-chargeable time. If it looms high, take steps to minimize it. The other check is against the estimate. If you estimate a job to take 10 hours make a contract price on that basis and it takes 14 hours, you lose again. However, it is not always labor supervision that is at fault. You may have estimated wrong. Make a note of such cases as guides to better estimating in the future.

Keep Track of Materials

Many contractors also lose money on materials because of loss, carelessness or theft, because they are sometimes left on jobs. If you experience such losses and are concerned about them, you may use a special materials requisition slip or material order, (Fig. 4), which the workman must sign when he gets materials. He must account for them on the job or return the difference to stock. In more than one instance, contractors could not check on losses until they began using signed material orders and then they found that the loss was due to bad handling of materials, in one way or another.

Of course, if you supervise all jobs yourself, you can eliminate a lot of paper work that a large volume contractor has to use because he gets a picture of operations only from the job records or from a periodical inspection of the work. Then too, the larger amount of money involved on labor and materials makes it impossible for him to get an accurate perspective of his costs, even if he stays on the job all the time. Yet, the contractor with a small business can go in the red unless he uses some semblance of costing, even if he works in the field with his men. However, it isn't necessary to burden yourself with a lot of paper work, since it is easy to use a single costing form as shown here and make whatever addition you care to, as your business increases.

Accounts Are Vital

The financial accounts will tell you how much profit you earned or the loss suffered for the period, an over-all figure in dollars and cents. The job records will tell you how much you earned or lost on each job, or all the jobs done in the period and will help explain the profit or loss figure. So, the contractor should check and analyze his job records periodically, determine where or why he lost money, then compare the total profit or loss with the profit or loss shown on his financial accounts. If there is a discrepancy, he'll have to investigate.

The reasons for discrepancies are so varied, we cannot detail them here. If there is a difference, a man must use common sense to find out why and take precautions against re-occurrence. Without job records, he is absolutely stymied in such investigation. If his job records are accurate he can come pretty close to finding out why he didn't make what he expected to make. If the profit and loss statement shows about the anticipated profit, he hasn't much to worry about.

Check on Profits

However, this is no reason for not analyzing his cost records periodically because he may always find ways to cut here or there or improve his cost control. The total profit or loss as shown by the job records and the profit and loss sheet are never likely to agree to the penny. There will always be a variation.

Besides using his job cost records to check results on his profit and loss statement, the dealer should refer to them whenever he estimates. Some contractors keep their records classified according to automatic heating installations, straight furnace jobs, air conditioning jobs, etc., so that they can refer to more than one job of a specific kind when estimating.

Where the *Indoor Comfort* dealer sells over-counter goods, he must take this business into consideration when he compares the job cost records with the profit and loss account for the period. Any other activity that gives him a profit other than job work he should isolate. This is done through departmentization, which is discussed in a later article. In other words, he must check the profit or loss on jobs as indicated by his financial accounts against the profit or loss as shown by his job records for the period in order to determine whether there is a big discrepancy and then investigate.

Material Requisition Slip

Quantity	Unit	Article	Unit	Amount

Fig. 4 Some contractors favor a materials requisition slip of this nature. Reverse side may be used to record materials returned from job. The material totals are posted to the job record.

Job costing aims to cost each job and compare the over-all cost with the selling price to determine the profit, to ascertain if this profit agrees with that the contractor estimated he should get. If the system you install does this, it is effective. Our purpose is to give you the basic principles of costing job work so that you can apply them to fit your business.

Job Envelope

	Name	Job No.
	Address	Phone No.
	Type job	Location job
	Started work	Finished work
	Sub-contractors	
	Estimated labor cost Actual labor cost Estimated materials cost Actual materials cost	Actual
	Estimated total cost Actual total cost	
	Selling price	
	Profit or loss on job	
	Remarks:	
6		

Fig. 5 Here is a sample job envelope. It is not necessary to have all this information on the outside. Only sufficient data to identify the job is needed.

Salesmen's Pay Governs Salesmen's Effort

DAVID MARKSTEIN New Orleans, Louisiana

Any contractor employing salesmen will find ample food for thought in this discussion of salesmen's compensation. Generally speaking, the salesman is a type of individual who is quite conscious of his own interests and the proper incentive will make him work like a demon.



In the photo you see a salesman filing away some of that "proper incentive" we were talking about at the left.

ARE you satisfied with the selling job done by your sales force? Are they selling the jobs you want them to sell, and in the volume you think they should? The way the salesmen are paid has a lot to do with your selling success.

A southern heating contractor learned the truth of this axiom recently. He had gone through the war years with a plan for paying his salesmen that dated back to depression days, when the idea was to sell any work as fast as it could be sold. His system was a small salary, supplemented with a sizeable commission. Immediately after the war, he found that the system had a bad flaw: the salary was small, but the big commission, which was put into force when sales were few and far between, drove his selling costs way up. The volume was high because of wartime prosperity. This very volume that he had sought desperately back in the depression now gave him a headache because he saw the company's payrolls climbing to higher and higher levels that were all out of line with prevailing costs of selling in the heating and air conditioning business.

A Change Is Needed

The contractor's first thought was to put his salesmen on a straight salary. The assistant manager threw up his hands in horror when he heard of this proposed change. "Ed," the assistant warned, "you won't have a salesman left three days after you put that plan into effect. Jobs are too plentiful today. We can't afford to lose good people, and they'll all quit us cold when they hear that the high pay is going to stop."

So the two pondered. Then they decided upon a course. The basic salary was raised to be in line with

present day, rather than depression levels, and a small commission was added to the basic salary. Unlike the original commission, it applied only on sales figures above a certain quota. This solved the immediate pay problem. But as reconversion continued, more trouble arose. He soon discovered that he had created an equally knotty, problem-in-paying-for-sales.

The salesmen were aware of the fact that any jobs involving scarce merchandise could be sold with practically no effort. Now they concentrated all of their efforts on moving products that had hitherto been hard to get. The staple work that brought in much of the regular profit was being neglected because the pay system put a premium on selling above a quota, and the simplest way to attain big individual volume figures above the quotas was to push jobs involving scarce things.

Different Plan Adopted

Again, the heating contractor considered changing to a straight salary set-up, and again his assistant warned against the move. "If you do," the assistant pointed out, "you'll put a premium on no effort at all. There will be no incentive for the salesmen to suggest additional purchases, up-trade the customers, or do anything else to hike the profits. They'll be getting the same money whether they work hard or whether they take it easy. A salesman needs the incentive a commission offers, if he is to do his best selling work."

At length, a system was developed that fitted the selling problems of the company. Again, the basis for payment was a salary. A commission was added to this, but it applied only on the kind of jobs that the contractor wanted to install. He knew that the scarce and hard-to-find things would sell anyway; the cus-

tomers would ask for them. So to make his sales force concentrate on the work that brought in most of the profits, the commission was made selective. It applied only after a certain quota had been reached, and it applied only on certain jobs. The present pay plan is working out well, but the heating contractor is aware now that it will not always furnish the incentive for his sales people to sell the work he wants them to move. He is ready to alter the plan for payment when and if conditions make a further change necessary. By fitting his payment system to the job he wanted his salesmen to accomplish, this contractor found that he not only kept his selling costs in line with good business percentages, but was able to sell the profitable jobs.

Three Ways to Pay

Basically, there are three ways you can pay salesmen. These are: straight salary, salary plus commission (or bonus), and straight commission. There are infinite variations of these three systems. They can be altered and molded to fit the particular selling problems of any heating and air conditioning firm.

Before considering some of the ways in which the basic payment plans can be combined, let's consider the merits and drawbacks of each. The straight salary offers a big advantage to the contractor: It lets him know month in and month out exactly what his selling costs will be. Being aware of what yearly salaries total, he can lay more exact plans for coming promotions and campaigns. The selling employee also gets a big advantage: security. He knows that his pay envelope will contain a certain sum whether the month is good or bad, saleswise.

But the employer misses the incentive that a commission gives to his salesmen. Since they are paid whether they produce or not, they have no reason for bringing in extra sales. From the employee's point of view, a straight salary plan penalizes the good man. The star salesman is bound to resent seeing his less capable fellow worker receive the same renumeration.

Commission Brings Volume

The straight commission plan offers the ideal incentive: No work, no pay. But, it too has drawbacks from the heating contractor's point of view. It is hard to find good men who will work on a straight commission basis. And the straight commission set-up forces the employee to close any sales that come along, whether they are the best kind of sales or not. It forces him to concentrate on volume at the cost of more profitable work. From his point of view, a straight commission is quite harsh; in the slow months, he doesn't eat.

Salary plus commision (or bonus) is the payment plan favored by a great number today. If the system is properly planned for the needs of the individual contractor, it can offer all of the advantages of the salary and straight commission plans, with the disadvantages of each reduced to a minimum.

The first thing to do in blueprinting a method for paying salesmen is to list all of the things you want to accomplish. Some of these aims might be:

- 1. Increasing the overall sales volume.
- Increasing sales of some particular kind of work.
- Uptrading customers to higher-priced, more profitable jobs.
- 4. Second selling.
- 5. Better handling of customer complaints.
- 6. Reducing the selling expense.
- 7. Stimulating sales of non-seasonal work.
- Offering a secure renumeration to the sales people so that capable men will be attracted to the company and remain with it over a long-term period.

Only after studying all of the things you want your sales force to do, can you plan a truly effective system for paying them.

Not long ago, a small town heating contractor sat down to follow this procedure of listing his aims before deciding upon a sales payment plan. He found that his company needed (1) an overall volume boost; (2) an increased selling effort in certain high-profit installations; and (3) a lowered selling cost, since skyrocketing wholesale prices and decreasing small town demand had eaten into his profits. In addition, he wanted to keep the experienced and proficient salesmen who had been with him for many years. That means the plan had to take into account the salesman's point of view.

Salary and Incentive

To give his selling employees adequate job security, it was necessary to make the basic pay a straight salary which was sufficient to cover their living expenses. To increase his overall volume, the contractor added to the straight salary an overriding commission on everything a salesman moved above a certain quota. In order to keep the cost-of-selling in line, this quota was set at the present yearly volume, so that commissions were paid only on new dollars the salesmen brought into the till.

But he had not yet made provision for increasing the volume in higher-profit installations. To do this, a bonus system was added to the salary and commision set-up. The bonuses were paid only on sales (above a quota representing normal business) of the highprofit work.

The salesmen have three ways to make money: First, they receive a straight salary. To this is added a commission for every sale above the normal volume. A third source of dollars comes from sales of particular work that brings the company a better profit.

Many sales pay schemes that looked beautiful on paper have failed because heating contractors did not take into account an important factor: Unless the sales force *understands* what you're after, it can't do the job you want.

When inaugurating a new system for paying salesmen, it is necessary to explain all of the details to them. You must be sure they understand you are not making the change merely as a means of cutting their incomes. If the employees believe you're cheating them, they won't deliver no matter how well you plan. And if they do not understand the system, they are unlikely to sell what you want sold.

Contractors who have shuffled the three basic pay-

ment plans around to fit their particular circumstances pass on these warnings to those attempting to blue-print a new sales pay system: Be sure the scheme does not involve so much paper work that whatever sales volume gains you make are nullified by the increased expense of keeping track of the salesmen's pay. Keep it as simple as you can. If you're paying a bonus for any special effort, don't wait until the end of the year to pay it. A promise of cash to be awarded months away is vague. It is a poor spur to

selling. Immediate money in the pay envelope brings in the volume. When paying a bonus, pay it monthly. Check over your pay system every six months or at most every year. The conditions around which you set up your system may have changed. The job you want done may be entirely different. Be sure that your plan meets current needs. The way you pay your salesmen has a great deal to do with your overall selling success.

NEWS SUMMARY OF THE MONTH

Housing Starts Total 100,000 in June

HOMEBUILDERS SCORED a new record for this year by putting 100,000 new permanent nonfarm dwelling units under construction during June, the U. S. Department of Labor's Bureau of Labor Statistics, announced. This preliminary estimate places June housing starts 5,000 above the May total and 2,200 above June 1948. Last year, a peak of 100,300 units was reached in May.

Preliminary estimates of housing activity for the first 6 months of 1949 show 450,800 new dwelling units put under construction, compared with 277,600 for the same period in 1948. Late reports of March 1949 housing activity have raised the total for that month to 69,400, an addition of 7,400 units.

Included in the 1949 January-June total are 20,200 publicly financed units, almost entirely state and locally financed. For the same months in 1948, publicly financed housing totaled 6,000 units.

A drop in 1-family starts accounts for the lower rate of homebuilding for the early part of this year. Apartment house construction is booming in most sections of the country, having been supported largely by the insured mortgage provisions of Section 608 of the National Housing Act. Comparing the first quarter of 1948 and 1949, the volume of rental-type units (2-ormore family structures) is 4 per cent higher this year, but 1-family starts are 8 per cent lower. On the basis of local permits issued, it appears that second-quarter data, when available, will show a much larger increase in rental housing.

Construction Workers Increase 65,000 in June

CONTRACT CONSTRUCTION EMPLOYMENT in mid-June totaled 2,081,000, according to preliminary estimates of the U.S. Department of Labor's Bureau of Statistics. This represents an increase of 65,000 workers from the revised mid-May estimate, but is 92,000 under the number employed in June 1948.

Most of the June 1949 rise in contract construction employment occurred in the West North Central and Middle Atlantic States. All regions of the country showed some rise except the Pacific States, where a slight decline from mid-May was reported.

The dollar value of new construction put in place during June totaled \$1,759 million, 11 per cent above the May estimate and slightly above the amount spent in June 1948. The largest dollar gains scored from May to June this year were for private homebuilding, public highway work, and construction for privately owned public utilities.

Private spending for new construction totaled \$1,241 million in June, a rise of \$124 million from May. New nonfarm housing, at \$600 million, accounted for almost half of all private construction expenditures during the month, having increased \$70 million from May to June.

Expenditures for public construction rose by \$51 million in June to \$518 million, and were at the highest monthly level in almost 6 years. Highway and street work accounted for four-fifths of the June dollar gain in public construction, jumping by \$40 million.

Construction activity for the first half of 1949, as measured by the value of new work put in place, was at a record high of \$8.5 billion, 4 per cent above expenditures for the first half of last year. Private expenditures of \$6.2 billion were 5 per cent under last year's January-June total, but public expenditures of \$2.2 billion were 37 per cent higher this year. State and locally financed construction was responsible for most of the gain in public expenditures, and accounted for 71 per cent of total public dollar volume during the first 6 months of 1949.

Professor Scheick Leaves Council

PROF. WILLIAM H. SCHEICK, coordinator of the Small Homes Council at the University of Illinois, has been granted a year's leave beginning Sept. 1 to serve as the first executive director of the newly organized building research Advisory Board in Washington, D. C. The board was organized by the National Research Council and operates under its jurisdiction.

As director of the Advisory Board, he will have the responsibility of formulating its objectives and laying the groundwork for a long-range program. An important amount of building research is concerned with housing, and in this respect Professor Scheick's new duties will be closely allied to his work in the Small Homes Council, of which he has been coordinator since its establishment in 1944.

Need for the Advisory Board arises from the complicated nature of the nation's building industry and in the many diversified research programs intended to improve building materials and methods. The board will coordinate these research activities and will stimu-



Signing contracts for construction of new warm air heating research residence are George Boeddener, secretary-treasurer, National Warm Air Heating and Air Conditioning Association and E. N. De Atley, Champaign, Illinois, building contractor. Looking on are, left to right: M. E. Childs, special research assistant in mechanical engineering, W. H. Kapple, assistant professor of architecture, S. Konzo, professor of mechanical engineering, N. A. Parker, head of mechanical engineering, R. W. Roose, special research associate, all of the University of Illinois.

Research Residence No. 3

THE CONSTRUCTION OF Research Residence No. 3 will probably prove to be of just as great importance to the warm air heating industry as the building of its two predecessors. The objective of the new residence is to provide the industry with facts on the best method to heat low-cost houses through the investigation of warm air heating systems considered most suitable for this type of home construction.

Designed by Wm. H. Kapple, assistant professor of architecture at the University of Illinois and a member of the University Small Homes Council staff, it is a typical 5 room basementless house. Of conventional construction throughout heat loss of the house has been calculated at 48,895 Btuh. No storm windows or

weather stripping will be used, just storm doors will be provided.

Completion is expected by the early part of September so that heating tests can begin this winter. Plans provide for the testing of 3 types of systems during the 1949-1950 season. One is a gravity warm air heating system with high sidewall registers in each room and 2 return air grilles in the utility room walls. The second heating system to be tested will be a forced air system using the same ductwork. The third system will be forced warm air with low wall registers in each room and 3 high side wall return air grilles. The system will be operated alternately for 2 week periods during the heating season to assure comparable conditions for all tests.

late new research on problems of building which need scientific investigation.

Although organized only since January (1949) the board already has completed one proejct—a survey of the progress of modular coordination which was made for the Housing and Home Finance Agency of the Federal government.

During Professor Scheick's absence, Prof. James T. Lendrum, associate coordinator of the Small Homes Council at Illinois, will be acting coordinator.

Warm Air Furnace Shipments

APRIL SHIPMENTS of 34,608 warm air furnaces valued at \$6.2 million represented a 16 per cent decrease from the 41,376 units shipped during March and were almost 11 thousand units below the April 1948 level of shipments. These figures are from the Facts For Industry bulletin on heating and cooking equipment published by the Department of Commerce.

Solid fuel furnaces amounted to 12,746 units, 36 per cent of the overall total; oil fired units equaled 9,660, 29 per cent; and gas fired furnaces accounted for 12,202 units or 35 per cent of total shipments. Forced air units made up 55 per cent of the April

shipments with gravity claiming the remainder. Inventory increased from 118,766 at the end of March to 130,371.

Air Conditioning Sales in 1948

SHIPMENT OF COMPLETE AIR CONDITIONING equipment and components and accessories for air conditioning and commercial refrigeration equipment during 1948 were valued at \$216 million, according to the Bureau of the Census, Department of Commerce. This represents a decrease of 8 per cent from the \$234 million shipped during 1947. Components and accessories for air conditioning and commercial refrigeration equipment amounted to \$163 million, or 75 per cent, of the total value of 1948 shipments; complete air conditioning equipment amounted to \$48 million or 22 per cent; and ice-making machinery, the remaining \$5 million.

The only category which showed an increase in 1948 was the self-contained air conditioning unit. These shipments increased 56 per cent, from \$9.9 million in 1947 to \$15.5 million in 1948. However, units other than room type increased only 9 per cent.

All these dollar value figures are the manufacturer's net billing prices, f.o.b. factory.

New Ore Carrier Launched



INLAND STEEL COMPANY'S new ore carrier, the Wilfred Sykes, largest ship ever built on fresh water, hits the waters of the slip as it is launched in the yard of the American Ship Building Company at Lorain, Ohio. The ship was named in honor of Wilfred Sykes, former president of Inland, and christened by Mrs. Sykes.

Blower Production in 1947

Manufacturers in the blower and fan industry shipped products valued at \$140.7 million during 1947, according to preliminary figures released by the Bureau of the Census, Department of Commerce. This represents an increase of 375 per cent over the \$29.6 million value of products reported by this industry in 1939, when the last Census of Manufactures was taken.

Production worker employment in the industry averaged 11,087 in 1947 as compared with 4,069 in 1939. Wages paid to production workers increased 441 per cent, from \$5.6 million in 1939 to \$30.3 million in 1947. The industry's expenditures for new plant and equipment during 1947 totaled \$3.6 million.

New Gas Pipe Line to Chicago Area

PEOPLES GAS LIGHT AND COKE COMPANY of Chicago has announced the formation of a new subsidiary to construct a third natural gas pipe line from fields in the Southwest to the Chicago area. The \$100 million project, scheduled for completion in 1953, will have an initial daily capacity of 340 million cu ft of gas. That may ultimately be raised to 500 million cu ft, more than the combined capacity of the two present lines, by adding a series of compressor stations. Application will soon be made to the Federal Power Commission for a certificate of public convenience and necessity for building and operating the line. Using pipe 30 in. in diameter the line will extend from Houston, Texas, to Joliet, Illinois.

Union By-Laws Ruled Illegal

A TRIAL EXAMINER FOR THE NATIONAL LABOR Relations Board, David London, has ruled that application of a union's by-laws which are in aid of a secondary boycott is illegal under the Taft-Hartley Act.

The union by-laws in question were those of Glaziers' Union, Local No. 27 of the Brotherhood of Painters, Decorators, and Paper Hangers of America, whose principal office is located in Chicago, Illinois.

These by-laws sought to prohibit members from working on projects that used preglazed sash. Preglazed sash includes doors, windows, etc., in which the glass or mirrors have been installed in frames before shipment to the site where they are to be installed.

The charges on which the General Counsel acted were filed by Joliet Contractors Association and nine lumber and building material dealers, all of Joliet, Illinois.

Anthracite Promotion Campaign

A CAMPAIGN TO URGE ALL USERS of anthracite coal to fill their storage bins before winter arrives is now under way, under sponsorship of the Anthracite Institute, Wilkes Barre, Pennsylvania. Ads will be run in newspapers with a total circulation of 10 million, telling the public that there is another tough winter ahead and that the smart thing to do is to be prepared for it.

Bookkeeping Machines Save Time, Money

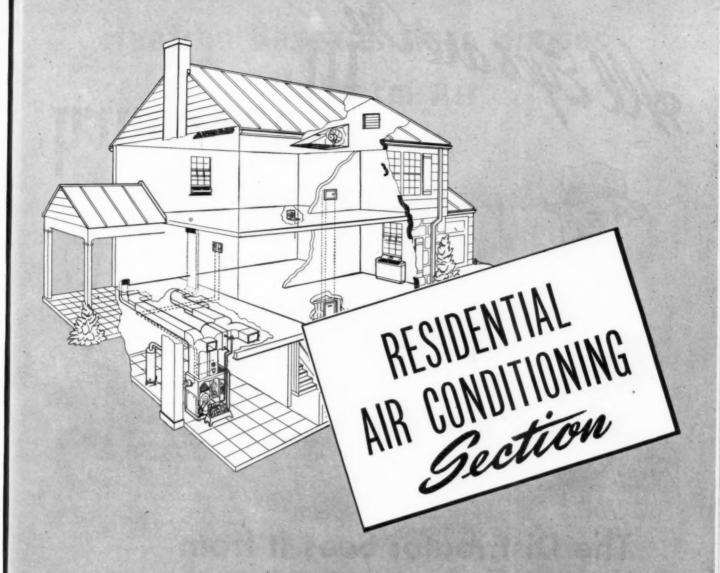
A 35 PER CENT SAVING in time, resulting in a reduction of \$2,185 a year in payroll preparation costs, has been effected by the Los Angeles Lathing Company, Los Angeles, California, through the installation of an up-to-date payroll system.

After two years' experience with the new system, during which it was closely scrutinized as to its efficiency and economies, R. A. Pierce, president of the company, one of the largest lathing contractors west of the Rockies, said: "There is no doubt in my mind that this system is one of the finest devised to handle the complexities of today's payroll—and that it's perfect for the contracting business, where the changes from job to job make for bookkeeping difficulties."

From 13 to 15 weekly entries have to be made for each of the firm's 275 employees, including records of overtime hours, double-time hours, earnings by job, F.O.A.B., and many others. Altogether, these total some 4,150 separate entries each week.

The task of making up a payroll with these detailed entries required, under the old system, the work of three people for about 15 hours every week, plus an additional 10 hours to post earnings records. But following the installation of bookkeeping machinery supplied by the Todd Company, Rochester, New York, only two people are required to do the work and it only takes them each 18 hours a week.

(Please turn to page 140)



INDOOR COMFORT - IN ALL SEASONS FOR HOMES AND SMALL BUSINESSES

All Eyes are Mulaterbury



The Distributor Sees It from

this Angle He operates under a specific policy. He has a complete line — a definite territory — factory protection of his distribution rights — friendly and helpful manufacturer-distributor relationship.

The Dealer Looks at It this Way

In Waterbury he has a line that permits him to service all types of jobs regardless of size of unit needed or type of fuel desired. A quality line backed by both factory and distributor.

Users have this Viewpoint They get accepted quality — real home comfort — freedom from service calls — the type of unit they want from hand-fired gravity to panel heating. They have confidence in the unit and in the integrity of both maker and installer.

THE WATERMAN-WATERBURY COMPANY
1122 JACKSON ST. N. E. MINNEAPOLIS 13, MINNESOTA

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Heating Basementless Houses with Warm Air

Basement vs. Basementless Houses

PART 1.

S. KONZO* W. R. HEDRICK** and J. M. DAVID*** University of Illinois

A recent AMERICAN ARTISAN editorial discussed the trend toward basementless houses and suggested that study and attention should be given the problem of heating this type of construction. The writer would like to survey the problem dispassionately and indicate some of the approaches that may be made in solving it. Unfortunately, data from research are lacking. Also, due to the complexity of the problem and the wide variety of possible approaches, time does not permit waiting until all solutions have been formulated and substantiated. To a certain extent it will be necessary to make a number of unverified assumptions. It is hoped that in the short series we can present:

a. the advantages and disadvantages of both the basement and the basementless home.

b. a suggested approach for the design of a relatively new type of warm air system for the basementless home, and

c. an engineering background of the assumptions made in the design, so that from it a better idea of the factors to be investigated in any test home can be clearly set forth.

Without further apology, therefore, this first article will attempt to present both sides of the picture of the existing controversy of basement vs. basementless homes.

A BOUT the time that the heating engineer and the heating contractor feel that they have the situation well in hand and that they are capable of designing and installing the accepted type of installation, some new development bursts over the horizon that causes them worry. This has happened before and is happening now. Basementless homes built upon piers, and provided with crawl spaces, have been common in southern areas of the country for some time. Basementless homes built upon a concrete floor slab placed directly on the ground were introduced in the warmer regions of the country. Now,

however, for some reason quite mysterious to the heating contractor, the idea of building basementless structures on a concrete floor slab has spread into the colder regions of the country. At first the argument given for the basementless home was that lumber was scarce and the omission of wood floors and joists would permit houses to be built with the minimum of wood construction. Later, as lumber became more plentiful no slackening of construction of basementless homes took place. When such installations were scarce, the heating contractor could well afford to shrug aside the idea as a "poor way to build a home in the north". The time is past, however, when such buildings can be ignored. That they do present a problem to the heating industry is well recognized, particularly when the reports from the field indicate that this type of building cannot be treated in the same manner as the conventional structure with a basement. One fact should be retained, and that is, whether you like it or not, or whether you would want to live in such a house or not, you will be confronted with the problem of satisfactorily heating such structures and providing a comfortable environment for the occupant.

The Case for and Against the Basementless House

Leaving aside for the moment all considerations regarding the method of heating the basementless home, let us look at the reasons for the current trend to the basementless house. The advantages claimed are being voiced in a spirited manner, particularly by builders and architects.

a. Basements are dark, damp, and gloomy. Hence,

Professor of Mechanical Engineering.
 Former graduate student, now with Surface Combustion Corp.
 Graduate student.

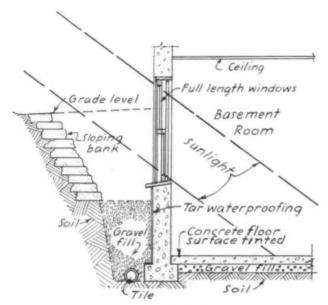


Fig. 1 Suggested construction for basement windows, as in Research Residence No. 2.

although the cubic feet of space are large in such basement areas, they are not usable.

- b. Basement stairs are dangerous, and unfortunately many of them are. Such stairs are narrow, too steep, not provided with sidewalls, and in many cases are poorly lighted. Safety records indicate that many accidents are caused by falls down the stairs.
- c. Utility areas with laundry and furnace rooms on the first story are more convenient, and therefore more functional, than isolated laundry and furnace rooms in a basement. This argument has been made possible by the developments in the heating industry. With the advent of mechanical systems using forced circulation, and the continued trend towards mechanical firing of furnaces, as well as the design of more compact units, the idea of a small utility room has been made an actuality. Certainly the architects have been quick to seize upon the possible shifting of the mechanical center of the house from the basement to the upper floor.
- d. Houses built entirely on one floor level, which can be done by eliminating both the basement and the second floor, are energy savers and particularly adapted to older people. It is true that greater horizontal walking distances are involved, but the energy of walking on one level is far less than that of walking up and down stairs.
- e. Probably no argument is as strong as the claim that the first cost of the complete basementless home is less than that of a home with a basement, both with about the same amount of living area upstairs.
- f. From the standpoint of the builder, a house without a basement eliminates worries regarding the excavation into rocky strata or

- provision for drainage facilities for the house. The depth of drain lines and storm sewers is of no great concern, since all of the plumbing will be above such lines.
- g. Architecturally speaking, the trend is towards houses that hug the ground. A two story house in an undeveloped area that is surrounded by flat terrain is difficult to blend into the background, particularly when no shrubs or trees are available to tie the house into the ground. A one story house is much easier to blend into the surroundings, and the argument is presented that as long as the house is all on one floor, "why not add a utility room and get rid of the basement?"

These are the main arguments proposed by builders, architects, and home builders. That some of the arguments are well founded cannot be denied. On the other hand, if as much care and thought were given to the design of the basement space as is given to the basementless home, some of the arguments would not remain valid. However, the usual approach, particularly by the heating man, is not to see what can be done about improving the basement, but to find counter arguments which will tend to discourage the idea of omitting the basement. In other words, a negative approach is used. Again, for whatever they may be worth, the listing of the disadvantages of basementless homes may be of interest:

- a. The utility rooms now provided on the first story are usually too small. When the space provided is to serve as a laundry room, heater room, storage, and occasionally as a rumpus room, the gain in convenience is offset by the lack of storage space. The space is not usable for other purposes when laundry is hung up for drying.
- b. The large space in the basement is low-cost space, since the additional cost of extending the footing down a few more feet and placing a basement floor is less than that required for adding a much smaller space above ground.
- c. A house can be of the bungalow (or one story type) which will tie in with the terrain, and still have a basement. The size of the lot required will not be as great as when the basement is omitted.
- d. Concrete floors usually used for basementless homes are hard surfaces with no resiliency or give, even when surfaced with asphalt tile, rubber tile, or thin carpets.
- e. The surface exposure of a one story house without a basement is larger than that for a one story house with basement, which in turn is larger than that for a two story house with basement, all, of course, based on equal room requirements above ground. Large surface exposures mean larger heat losses, assuming equal amounts of weather proofing, and consequently require larger fuel consumption.
- f. The first story rooms of a two story house are cooler in summer than the rooms in a one story house. In the case of a one story house, the construction of the attic must be such that adequate ventilation is possible to flush

out the heated air in the attic. In extremely hot weather, a basement room often serves as a refuge to escape the heat in the upstairs rooms.

- g. Moisture release from drying laundry in the basement is partly dissipated by leakages of cold air into the basement; whereas, when the laundry dries in the utility room upstairs it is released immediately into the main living quarters. Since houses are being built tighter and with weather stripped windows, the net result in many cases is that the indoor rela-
- level. However, in the case of basementless structures, special precautions must be taken, as will be indicated in a later section.
- j. With coal fuel it is easier to provide a furnace room in the basement in which the coal and ash-handling processes can be confined, than in a utility room on the first story.

Undoubtedly other arguments both pro-and-con are being presented, some of which have some merit. However, the discussion is somewhat fruitless as now carried on, for the reason that the opponents of basementless construction are not completely answer-

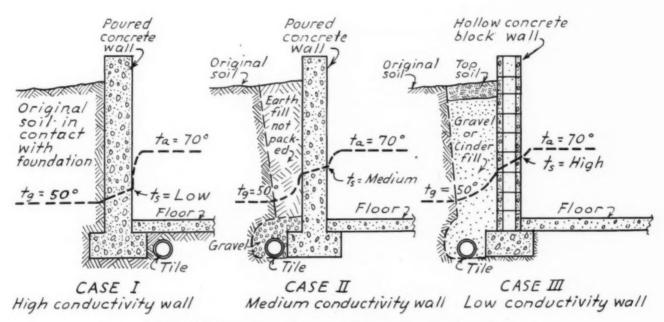


Fig. 2 Surface temperatures of basement walls in summer. (Dotted lines show temperature gradient from basement air to ground. If t_n is lower than dewpoint temperature of basement air, moisture will condense on basement wall. Case III is preferred, since t_n approaches t_n.)

tive humidity becomes excessively high on laundry days.

- h. Since chimney heights are reduced with basementless homes, and in some cases may not be as great as those of surrounding taller buildings, the problem of proper venting of the combustion products may occur.
- i. With a basement in small compact homes of the types in common use, a low-cost gravity warm air system can be successfully used. The tests at the University of Illinois indicated that even an extended plenum type of gravity warm air system can be used with success. In this system the ducts were carried flat at the ceiling with no pitch from the bonnet to the register, with all branch ducts fed from an extended trunk duct also carried horizontally from the furnace plenum. The available space in the basement was greatly increased. Furthermore, the conventional forced air system can also be readily installed, with excellent performance as regards warm floors and low temperature gradients from floor to breathing

ing the disadvantages enumerated for the "damp, dark, and dreary" basement space, and are not conducting a constructive campaign for better construction of basement quarters.

Improvement of Basement Construction

The writer is neither a builder nor an architect; he has, however, been in basements, dozens of them. If the basement has fallen into disrepute, plenty of evidence exists to support the derogatory statements made about it. However, it seems to us that if builders, architects, and homeowners would spend some time and thought on the possibilities of a good basement, that many of the abuses could be readily eliminated. Let us enumerate some of the ways in which improvements can be made:

a. In the first place the process of going down into the basement is a hazardous one. The stairs are often too steep and the treads too narrow. The siderail consists often of a single bar. An enclosed stairway with a sidewall is safer; in case a person slips he has something to lean against rather than a single handrail which might be missed during a fall. In many cases no intermediate stair landing is provided, and the descent is made in one direction only. In case the stairs do go down in two directions, the treads are often made narrow on the inside and wide on the outside. In fact, the common basement stair is practically a step ladder out of a deep hold. This need not be the case. Safer stairs that are adequately lighted and enclosed can be constructed. Any stair is a potential hazard, but the hazards can be markedly reduced.

b. Few basements are adequate in height. A clear space of 7 ft. from the floor to the underside of the

house. See Fig. 1. Furthermore, instead of providing a narrow, shallow window areaway on the outside, the architect provided a sloping areaway that permits the sun to enter the basement. If solar radiation was ever needed anywhere it is in the basement. By using the large, sloping areaway, the daylight intensity was so greatly increased over that of a normal basement room, that the feeling of being completely enclosed in a concrete vault was largely minimized. The sloping areaways can be constructed in the form of a rock terrace, and can even be covered with plantings. In view of the large exposure to weather, the

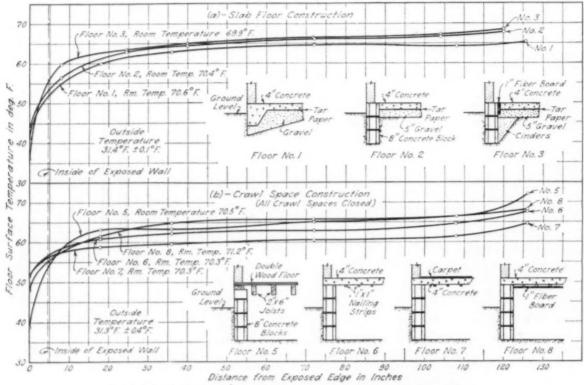


Fig. 3 Variation in temperature of the upper floor surface: slab construction; crawl space construction.

(Curves plotted from data presented in report by National Bureau of Standards, B.M.S. 103, by Dill, Robinson, and Robinson. Figure originally appeared in Univ. of Illinois Eng. Exp. Sta. Circ. 53, pp. 146-160, by Konzo and Roose.)

floor joists is a minimum, and 7 ft. 6 in., or more, is immensely better. A low ceiling gives you the impression of a space restriction. The addition of even one extra course of concrete block, or haydite block, will do much to improve the headroom and will permit all heating ducts, plumbing pipes, and electrical connections to be carried well above head level. This was demonstrated in the construction of the Warm Air Heating Research Residence No. 2, and the feeling of spaciousness that was obtained is sensed in few homes.

Windows Can Be Improved

c. Basement windows are reminiscent of dungeons, and consist mainly of narrow, small, steel sash that allow a little light to enter the upper part of the basement. Here is one place that a distinct improvement can be made. This was adequately demonstrated in the research residence, when the architect was asked to provide full-length windows, similar in type and size to those normally used in the upper part of the

bottom of the areaway should be filled with crushed gravel to provide good drainage to the tiles around the footing. It is possible, of course, that in certain snow belts the areaways will be filled with snow during portions of the winter.

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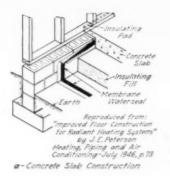
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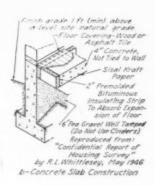
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Basement lighting can also stand much improvement. Since daylight type lamps are available, the only excuse for inadequate artificial lighting is either a lack of funds, or failure to appreciate what can be done. Obviously, light-colored walls and a finished ceiling will add tone and life to the space.

d. Basement dampness is a frequent complaint, particularly in spring and summer. The causes can be due to one of many sources, and the cures are not always easy to make. Assuming that the tile drainage around the footings is adequate, and that free moisture is not coming in around cracks in the foundation and floor, the usual complaints of damp basement walls are due to:

- 1. high humidity of the basement air, and
- 2. cold wall surfaces.





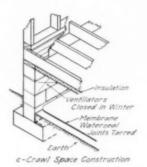


Fig. 4 Recommendations and findings concerning efficient heating construction.

(Reproduced from Univ. of Illinois Eng Exp. Sta. Circ. 53, pp. 146-160, by Konzo and Roose.)

The use of larger basement window areas and the added heating effect of sunlight will do much to provide better ventilation during the summer and to increase the wall surface temperature.

In the course of a number of inspections, it has become evident that damp basements are often the result of neglect and are not a necessary accompaniment of all basements. Briefly stated, an adequate tile drainage around the footings is essential. So, also, is a thick covering of gravel or cinders above the drain. Trees planted too close to the house can send roots into the drain and block it. These items are commonly accepted. What is not so easily recognized is that surface moisture should be drained well away from the building. For example, if downspouts carry roof drainage to the ground, the water should be discharged several feet away from the foundations so that it cannot run back towards the foundation. Furthermore, the ground should be compacted near the building and the water made to run off away from the building, instead of standing in pools. The outside of the basement wall should be coated with water repellent material, such as tar, so that no openings exist for water entry.

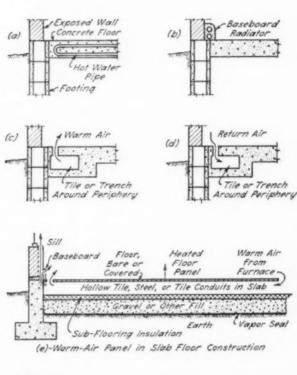
Using Clay As Form Wall

One case which came to our attention was that in which the builder had omitted the outer form for the poured concrete foundation, so that the clay formed the outer form. In this case, the poured concrete foundation wall was in intimate contact with the earth. See Fig. 2, Case I. Not only was there no moisture barrier on the outside, but no barrier existed to rapid heat flow from the concrete into the clay. In fact, the conduction heat transfer would be so good that the temperature of the inner wall surface

would be practically the same as that of the ground. As long as this wall surface temperature was below the dew-point temperature of the basement air, condensation would occur, and did in copious streams. The use of a moisture barrier and a definite break in the thermal bond between the concrete and the earth is indicated. See Fig. 2, Case II. To some extent, either a concrete block wall, or haydite block wall, with cored openings would be a better thermal insulator than a monolithic poured concrete wall. See Fig. 2, Case III.

Ventilation Is Needed

Good ventilation requires large basement window openings on all sides of the basement. The ventilation serves not only to carry out moisture generated in the basement, or coming through the floor, but also serves to raise the temperature of inner wall surfaces in spring and summer. If the basement is partly excavated and partly in the form of crawl space, the ground moisture that is released in the crawl space will be large and will require adequate ventilation in the crawl space area. The minimum requirements



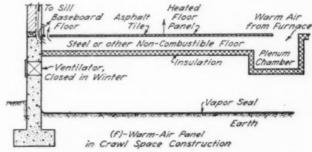


Fig. 5 Six methods of distributing heat in floor or close to floor. Edge insulation should be provided in all cases. (Reproduced from Univ. of Illinois Eng Exp. Sta. Circ. 53, pp. 146-160, by Konzo and Roose.)

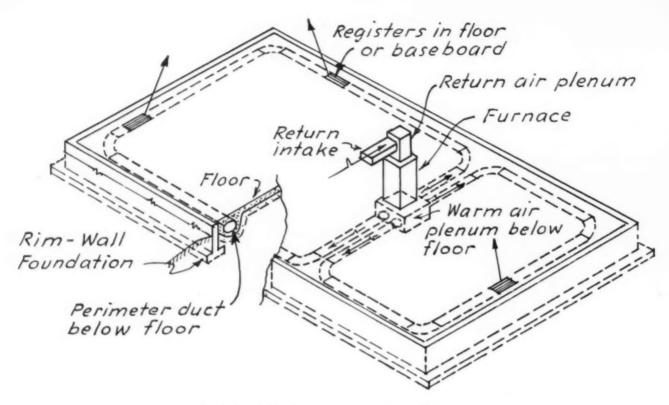


Fig. 6 Sketch of perimeter warm air system. (House construction above floor not shown.)

for crawl space ventilation are covered by F. H. A. requirements. Except in tightly closed basement spaces, the use of chemical salts for absorbing moisture is not too satisfactory, since ventilation air brings in a large amount of water vapor that would require constant replenishment of the salt. The writer has also observed that in certain times of the year, it is preferable to keep out the outdoor air. During a wet cycle, such as occurs in the springtime in the midwest, the outdoor air is almost saturated at times and bringing in such moist air causes condensation to occur on cold water pipes and toilet closets. Hence, ventilation under such conditions may not do much good, and closing of basement windows might be necessary. The only satisfactory manner of preventing condensation on cold water pipes is to cover the pipes with some water repellent type of insulating material.

e. Basement dirt, particularly where ash and coal handling is necessary can be largely avoided by proper design of the furnace room. Details of basement construction for burning of solid fuels is covered in great detail in an issue of the circular series of the Small Homes Council of the University of Illinois.

Special Problems in the Basementless House

In spite of the fact that the preceding suggestions for the improvement of basement construction will do much to remove the curse from the basement, the use of basementless homes will continue, mainly because of the lower initial cost. It is true that houses built upon slab floors have been used successfully for many years in mild climates. However, when the practice was extended to colder climates, a number of problems were encountered which were not anticipated:

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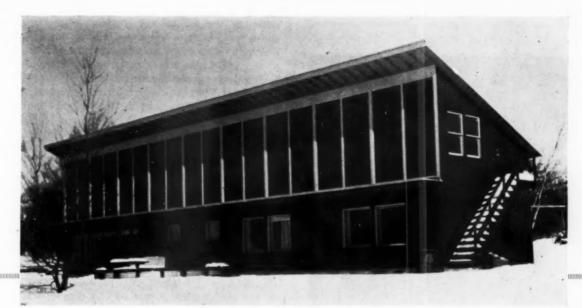
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a. The moisture problem still remains. A case was presented to us in which the builder had poured a concrete slab directly upon a gravel fill, which in turn was placed on top of the ground, without benefit of a moisture barrier. The finished floor consisted of asphalt tile in part of the house. The emulsion used for gluing the tile to the floor was dissolved by the water from below and oozed out between the tiles so that the tiles became loose. The finished hardwood flooring expanded with moisture and the joints were compressed into ridges. Not only is the use of a positive means of stopping water vapor necessary, but a long period of time must be allowed to permit the concrete to thoroughly dry out. One form of moisture barrier which is commonly used consists of heavy asphalt paper, lapped and tarred at the joints. This barrier is placed below the concrete slab and is extended upwards at the sides of the floor slab to the top of the foundation wall.

b. A large heat loss along the edges of the building results in cold floor surfaces along the outer edges of the floor. See Fig. 3. As reported from the first series of tests by Dill and associates at the National Bureau of Standards, and the later series of tests at the University of Illinois by Bareither and associates, (Please turn to page 160)

AMERICAN ARTISAN, AUGUST, 1949 RESIDENTIAL AIR CONDITIONING SECTION



Exterior View of Complete House

Davis Studio

Heated By The Sun

DR. A. NEMETHY
Massachusetts Institute of Technology

THE heating system for the first house heated entirely by solar energy was designed by Dr. Maria Telkes, research associate at the Massachusetts Institute of Technology. The house was designed by Eleanor Raymond, Boston architect, and built as a pri-

vate project on the estate of Amelia Peabody in Dover, Massachusetts, 15 miles southwest of Boston. Dr. Telkes calls it the "Pilot House" because it is the first experimental sun heated house in which people are living as private occupants.

What Has Been Accomplished Before

It has been estimated that in at least two-thirds of the United States enough energy falls during the winter months to heat most of the houses without the use of additional fuel, provided the energy of the sun can be collected and stored efficiently. Storage of the energy is the more difficult part of the problem.

People living in houses with large windows noticed that the rooms facing south became overheated during clear winter days. The conclusion was obvious: Build

Here is the story of the first house which collects and stores the energy of the sun to provide a means of heating. Even though this house has been built and is being tested, the process is still in an experimental stage.

large windows on the south side of the house, and let the low slanting rays of the winter sun penetrate far back into the rooms. During the past fifteen years architects have used larger windows and the term solar house has become quite familiar, to indicate a

house inviting the rays of the winter sun. Of course, there was fuel saving during the daytime. Many times the rooms were even overheated and windows had to be opened, but it was not possible to store the sun's heat, even concrete floors did not retain it sufficiently, and the furnace had to take over its usual role about one or two hours after sunset. At night, and on cloudy days, the heat loss was so great that during the entire heating season the fuel saving was relatively small. Two identical houses built at Purdue University under the direction of Professor F. W. Hutchinson, University of California, revealed the fact that the orthodox house, with windows of usual size, used less fuel than the solar house having large windows. Both types of windows had double glass panes with a sealed air space between them, which cuts the heat loss in half com-



Davis Photo

Fig. 1 Metal collector sheet nearly completed. This will be painted black before the glass is installed in front of it.

pared to single windows.

The investigation of solar energy utilization was made possible by a Foundation given to the Massachusetts Institute of Technology by Godfrey Lowell Cabot. A small test unit was completed in 1940, designed by Professor H. C. Hottel, M.I.T. The two-room structure stored heat in a very large water tank occupying the entire basement. The energy of the sun was collected on the roof, on a black metal plate covered with three air-spaced glass plates, to prevent to some extent the outward loss of heat. Pipes were soldered to the black metal plate, and the water of the tank circulated through them when there was sufficient heat available from the sun. This installation proved that the structure could be heated with solar energy alone, but the cost of the large tank could not compete economically with conventional heating systems.

The solar heating tests, delayed by the war, were resumed at Boulder, Colorado, by Dr. George O. G. Löf, of the University of Colorado. His own home was equipped with a roof collector and ducts to circulate the air heated by the sun. The collector occupied only one-third of the roof and cut the fuel bill 20 per cent,

although the altitude of Boulder is nearly one mile above sea level and the average amount of winter sun is nearly twice as great as that received in the vicinity of Boston, Massachusetts. Dr. Löf attempted to store solar energy by conducting the warm air through a duct filled with crushed rock, and circulating the air from the rooms at night to pick up the stored heat. Recently a small house was built at the Massachusetts Institute of Technology in Cambridge, Massachusetts, which uses a smaller water tank, placed on the roof, for solar heat storage, capable of storing about two days' heat supply. It is furnished with an electric heater to keep the house warm during a sequence of cloudy days.

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The Collector

All the tests proved that the most efficient solar energy collector is a black metal sheet, placed behind two or more air-spaced glass plates, with the back side of the metal sheet insulated. Of course the best collection would be possible when the sun's rays hit the collector surface at a right angle, but solar azimuth and altitude vary each day and hour, and to turn a collector according to the position of the sun would be very difficult and not economically feasible. Experiments have shown that in the Boston latitude (42°) during December and January the amount of solar energy falling on a south-facing vertical collector is only a few per cent less than the energy incident on a tilted collector in the most favorable position. Moreover, the vertical collector avoids the trouble caused by snow deposits.

The efficiency of collection depends (1) on the amount of sunshine and (2) upon the temperature difference between the collector and the outdoor air.

The average amount of winter sunshine reaching a south wall is, in the Boston zone, 1000 Btu per sq ft per day. The hourly amount of sunshine varies (according to cloudiness and angle of incidence) between 100 and 300 Btu per sq ft an hour.

The actual facts about the heat losses can be compared for walls and windows of different constructions when the heat-loss coefficients (U values expressed in Btu per square foot, hour, and temperature difference in degrees) are compared:

	U $value$
Single glass window with weather stripping	1.15
Double window with sealed air space	0.55
Usual frame construction wall	0.25
Well-insulated frame construction wall	0.1 - 0.15

Wind may increase the above figures, especially for the single window.

The collector used in the Dover house has an outward heat loss through the double air-spaced glass plates of a U value of 0.55, and a heat loss on the back side through 4 in. thick rock-wool insulation of a U value of 0.15, the over-all loss factor equaling 0.7 (considering wind, we may use 0.75).

The glass plates transmit about 75 per cent of the solar energy during the most favorable part of the day. When the angle of incidence is greater than 60 deg, that is, during the early morning and late afternoon, the transmission becomes progressively less.

As said before, the outward loss of the collector due to radiation and convection increases with the temperature difference between the plate temperature of the collector and the temperature of the outdoor air. Hence, it is obvious that when this temperature difference is high, as on a very cold day, the outward losses will increase, and under certain conditions nothing can be collected. A simple calculation serves to illustrate this fact: On a partly cloudy day with an incident solar energy of 100 Btu per sq ft an hr, the collector plate may be heated to 120 F. The winter outdoor temperature may be 20 F. Therefore, the temperature difference is 100 F. Seventy-five per cent of the incident solar energy is transmitted through the glass plates, or in this case 75 Btu. The outward loss (U \times Temp. Difference = 0.75 \times 100) is 75 Btu. The outward loss just equals the transmitted amount of solar energy, and therefore no heat can be collected at

The following energy balance can be made, per square foot, during various hourly values of solar energy:

	Clear Day					
	Temp	ence				
	70°	100°	130°			
Incident Btu	300	300	300			
Transmitted Btu	225	225	225			
Outward loss Btu	50	75	100			
Net heat gain Btu	173	150	115			
Efficiency: per cent of						
incident solar energy	58	50	38			

	Hazy Day			
	Temp. Difference			
	70°	100°	130°	
Incident Btu	200	200	200	
Transmitted Btu	150	150	150	
Outward loss Btu	50	75	100	
Net heat gain Btu	100	75	50	
Efficiency: per cent of				
incident solar energy	50	38	25	

	Partly Cloudy Day Temp. Difference			
	70°	100°	130°	
Incident Btu	100	100	100	
Transmitted Btu	75	75	75	
Outward loss Btu	50	75	100	
Net heat gain Btu Efficiency: per cent of	25	0	0	
incident solar energy	25	0	0	

It is obvious that more solar energy can be collected at lower collection temperatures, and considerably more on clear days than on hazy or partly cloudy days.

How Much Sunshine?

The Weather Bureau statistics show that in the Boston zone and during the winter months we can expect an average of ten cloudy days (when no solar energy can be collected) per month. Of the remaining twenty or twenty-one days, fifteen will be above-average clear, sunny days, and five or six days will be



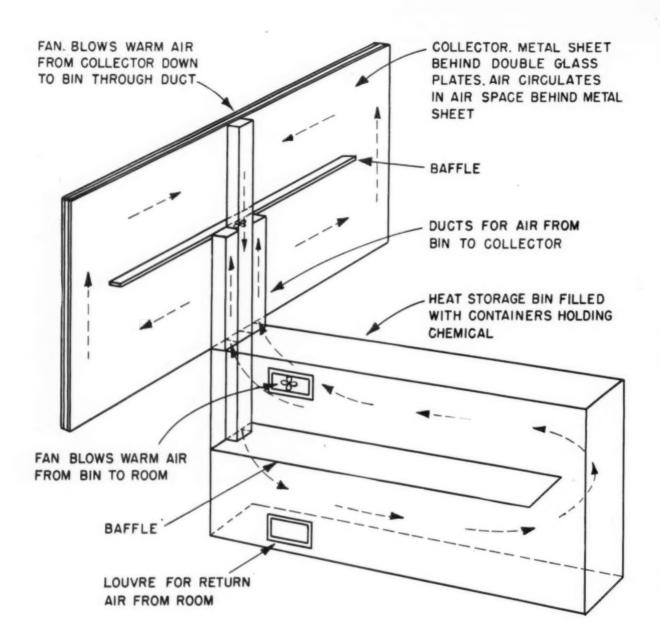
Davis Photo

Fig. 2 Black metal collector sheet with the first two sheets of glass in place.

partly cloudy, when only a few hours' sunshine can be expected. The distribution of sunless days and clear days is recorded in the statistics of the Weather Bureau. In the Boston zone the longest sequence of sunless days was seven days, but that has happened only once in eighteen years. Sequences of two, three, and even four days occur frequently. A heating system would be safe only if it could store enough heat for adverse weather conditions, that is, for eight or nine days (in the Boston zone).

A solar heating system must be able to furnish a relatively high percentage of the total heat load. An auxiliary heating system, burning fuel or using electrical heating, can be economical only if its initial cost is relatively low and the fuel cost is negligible.

It may be possible to use an auxiliary electrical heating system as a standby for unfavorable December or January conditions, provided that the heating supplied by it is less than 5 to 10 per cent of the total heat load. It should be remembered that the cost of electricity may be about three to four times greater than the cost of other fuel. A solar heating system obtaining 75 per cent of its heat from the sun and 25 per cent



from electricity would still have to be charged with $4 \times 25 = 100$ per cent fuel costs.

The storage of the collected solar heat is therefore the most important and most difficult part of the solar heating problem.

The Storage of Solar Heat

As mentioned before, water and other materials have been used as heat storage media, using the specific heat effect of these materials. This type of storage is possible only in a limited temperature range. The temperature of water cannot be increased above 120 F, under the climatic conditions of the Boston zone. Only 1,300 Btu can be stored in one cubic foot of water. A large volume of water would be needed to store the amount of heat required for an average house. The specific heat of crushed rock or bricks is only about half that of water, compared on an equal volume

basis; the use of these materials would therefore require twice the heat storage volume of water.

Dr. Telkes suggested the use of the heat of fusion, or heat of melting of chemical compounds, for heat storage. The heat of fusion is the quantity of heat necessary to melt one pound of solid. The material remains at the temperature of its melting point until the entire mass becomes liquid. Above the melting point the chemical absorbs more heat according to its specific heat. A chemical compound had to be found which: (a) has a high heat of fusion (to be able to store a large amount of heat per pound), (b) melts at a convenient temperature, and (c) is easily available and cheap. One of the materials suitable for this purpose is Glauber's salt (Na2SO4 · 10H2O). It has a heat of fusion of 104 Btu per lb and melts around 90 F. One cu ft of Glauber's salt stores, at the melting point, 9,500 Btu and can store six to seven times more heat

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than water does on an equal volume basis. Other chemical compounds or mixtures are available.

In the sun heating system the collected sun heat warms the chemical, which melts and absorbs the heat. When the heat is released again, to heat the rooms, the chemical crystallizes again. This process of melting and re-crystallizing can be repeated without any loss or change in the material, although certain additional agents are required to promote crystallization and to inhibit corrosion.

Design of Solar Heating System

To calculate the needed collection surface and the quantity of chemical compound for a sun-heated house, many items have to be considered. Geographic location, Weather Bureau data of degree days, sun-

The framework casts shadows on the collector, and the labor of framework construction and the mounting of the glass may more than offset the lower cost of small panes. An alternative, figured glass, is obtainable in relatively large panes about 4 ft wide and 8, 10, or 12 ft in length, without any increase in the cost per square foot. A number of figured patterns exist: some of them are suitable only for indoor applications. Various types, with shallow patterns, probably transmit as much solar energy as a highly polished plate would (at a fraction of the cost). The labor involved in placing one large glass pane is, of course, considerably less than the installation of many small pieces; there are no shadows due to the numerous framing pieces, and there is less danger of air leakage due to improperly puttied panes. The Dover house uses 4 by 10

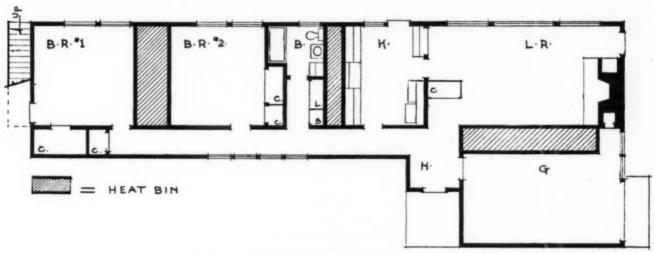


Fig. 3 Here is the floor plan of the house. The collector bins are indicated on the drawing.

shine hours, incident solar energy, number and probable sequences of clear and cloudy days have to be studied carefully. The heat load of the house has to be accurately calculated. It is apparent that farther south the amount of sunshine received is greater and the degree days are lower. Therefore, the heating requirement is less, and as a result the collector area and the heat storage volume needed are proportionally less.

For the Dover house (of 8000 cu ft volume) a collector surface of 720 sq ft was needed. It forms the south wall of the attic, 72 ft long and 10 ft high. This location is not restricted. The collector could form the south wall of the first floor (between windows and doors) or it could be completely separated from the house in the form of an external wall or fence.

The collector should be simple to install and economical both in material and in labor costs. These requirements limit the number of glass panes to two. Most glass of window glass quality is able to transmit nearly 88-90 per cent of the sun's radiation, unless the angle of incidence is unfavorable (greater than 60 deg). The losses are due to reflection losses, which amount to 8 per cent at normal incidence per glass pane, and only a little energy is absorbed by the glass itself (obviously, special heat absorbing glasses should not be used). The cost of window glass per square foot is lower when smaller panes are used, but in this case too much framework is needed to hold the glass.

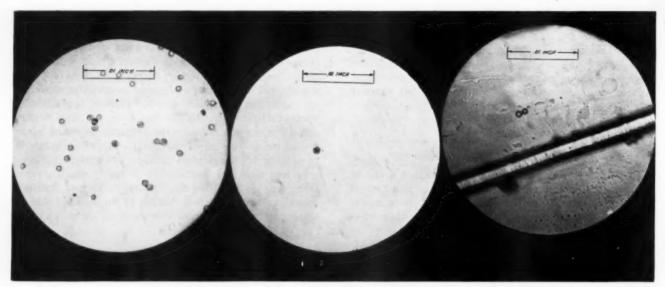
ft figured glass panes, with $\frac{3}{4}$ in. air space between them

The metal plate behind the glass was built of stock sheets of galvanized steel. The seams were tightly closed to prevent air circulation and the possible accumulation of dust between the metal plate and the glass. Ordinary black sheet metal of relatively thin gauge would be equally suitable. The collecting surface of the metal plate was coated with an undercoat to eliminate possible rusting, and then was painted with a good-quality flat black. The back side of the plate was painted with a rust-preventive primer. Fig. 1 shows the metal plate nearly completed. Fig. 2 shows the mounting of the glass.

How Collector Works

Behind the metal plate there is a 3-in. air space enclosed by a well-insulated wall. The collector is divided into three parts, each a separate collecting unit, in connection with a heat-storage bin. The air space in each unit is divided by a baffle, leaving an opening at each end. From the upper part of the air space, a duct goes down to the lower part of the heat-storage bin. Two smaller ducts connect the lower part of the air space with the upper part of the heat-storage bin.

The heat-storage bins are on the first floor level and form the walls between the rooms. One bin is between (Please turn to page 164)

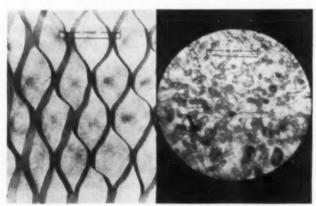


Shown above are three photomicrographs. The one on the left shows a sampling slide from the pollen removal efficiency test. This was exposed on the upstream side (unfiltered air) of a standard filter. The middle circle is a slide exposed on the filtered side. On the right you see two pollen grains, streak is a human hair.

Air Filters Defeat Ragweed Pollen

G. H. PIERING Research Products Corp. Madison, Wisconsin

PERHAPS you are the one person in fifty who is susceptible to the pollen of certain weeds and grasses. If so, the symptoms of this annoying disease, commonly called hay fever, will become noticeable to you around the middle of August. For a period of approximately two months you will suffer from irritation of the eyes and nose. You will want to scratch your eyes completely out of your head; your speech will resemble that of one suffering from a terrific head cold; and the members of your family who are not afflicted with this aggravating malady will not be able to please you, no matter how hard they try.



On the left is a photo of one layer of standard filter after efficiency test. Right is a photomicrograph of one section of one layer of a standard filter after the test showing pollen collected on filter.

There are many offending plants which give off their irritating pollen, but the worst villain of all is common ragweed. Practically all the territory east of the Rockies-with the exception of the northern Great Lakes Region, northwest New England and southern Florida-grows ragweed in sufficient quantity to produce symptoms in susceptible persons. As a result, people living in ragweed-infested regions usually manage to take their vacation each year sometime during this period and migrate to the allegedly non-infested regions. Many vacationing sufferers are somewhat surprised to find that they do not obtain relief in these supposed pollen-free areas. The direction of the wind is a very important factor in determining whether or not an area will be contaminated. Ragweed pollen may be blown for nearly a hundred miles and thus affect both vacationers and persons not ordinarily susceptible.

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City dwellers have gone to great lengths to overcome their susceptibility to hay fever. Ingenious devices such as nostril plugs and aluminum masks are employed along with immunization shots. Of these preventive measures, the immunization shots have proved most effective provided they are begun well in advance of the hay-fever season and are continued for a definite period of time. However, the expense incurred is a definite drawback as the cost of each shot ranges from approximately \$3.00 to \$7.00 and from 15 to 30 shots

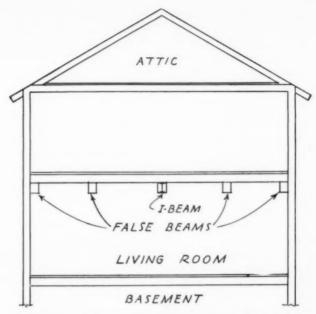
(Please turn to page 166)

The Knight of the Bath Mystery

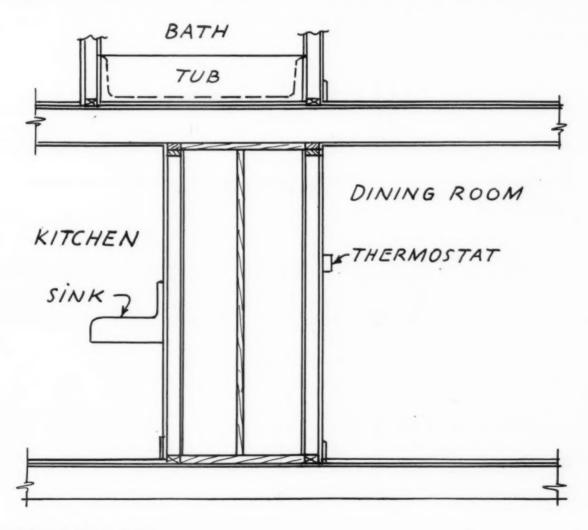
BY SUREWARM HOMES

I WAS lying in my cozy air conditioned tepee with my head toward the fire to keep my wigwam warm, thinking of the pleasant summer days, when there were no heating problems and alas, no revenue, when my musing was disturbed by my door bell playing my familiar theme song, "I Don't Want to Set the World on Fire, I Just Want to Start a Flame in Your Heart." Before I could get to the door the impatient client had burst in covered with snow, his monocle frosted up so he could not see the black cat lying on the rug, causing him to fall heavily. After being revived my visitor poured out his troubles to me.

It seems that since he had his house remodeled he could not take a bath in comfort, and that his living room, although warm around the edges, was always cold in the center. He bemoaned the fact that he ever remodeled his home and heating system. So, with great reluctance to leave my fireside, I climbed into my great coat and accompanied the client to his home. It proved to be rather a dismal, foreboding old mansion, and although the building had been remodeled and



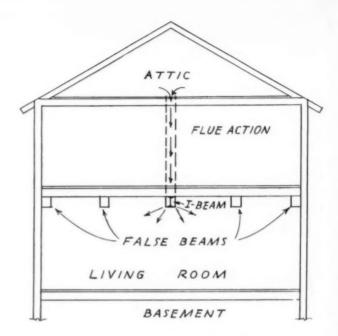
repainted a dull gray, there wasn't the cheery gleam from the windows that you normally expect of homes. On entering I was agreeably surprised that the interior had a pleasant and homey appearance. However, upon taking off my mittens and great coat, I realized that my client had not exaggerated the conditions.



On going over the heating system, I found that it was the usual well-designed job, but corners had been cut wherever it did not show. In checking the thermostat, I found that the location was not near a warm air lead, and there was apparently no reason why it should not function properly. From outward appearances, there was no evidence of the cause of the thermostat's instability. The bathroom, by the way, was directly above the partition on which the thermostat was located.

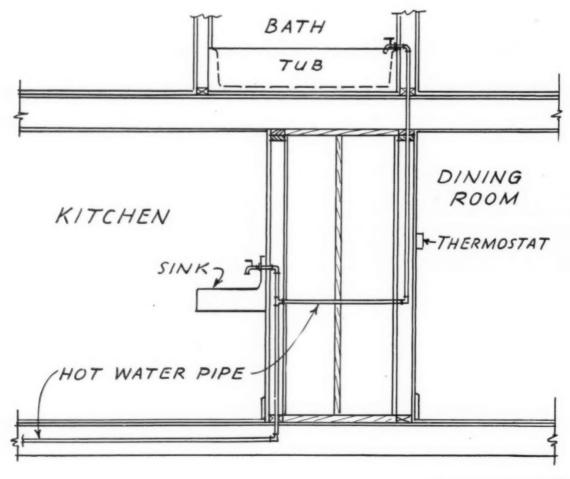
The living room was a huge room with a beamed ceiling. It had originally been two rooms, and as the poor man had said, the center of the room was definitely cold. You had the feeling of standing in a tomb, although when you were at the outer edges of the room it was fairly comfortable. The diagram shows the beam ceiling which was the cause of the cold center in the living room. Can you deduce why the beam ceiling should make the living room cold, and why a bathroom located above a partition with a thermostat should make it unstable, even when there were apparently no pipes starting from the basement up through that partition?

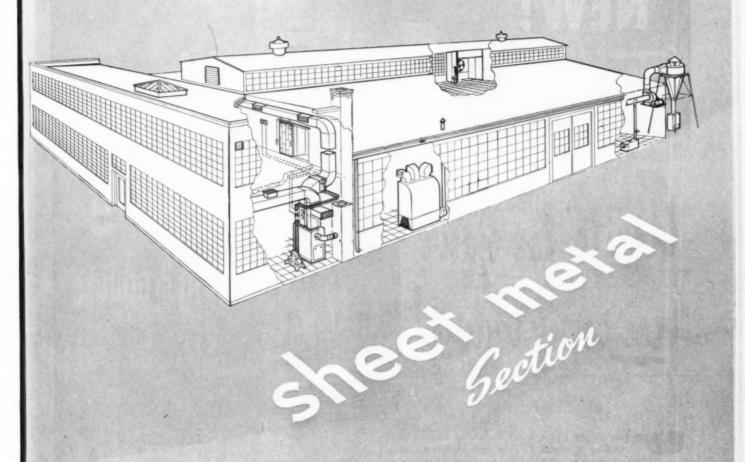
Yes, you were right. There was a hot water pipe that had been brought up through the partition, going off at a right angle from the partition on which the thermostat was located. When part way up the wall, this pipe turned and traveled horizontally until it entered the partition behind the thermostat. It then continued on up to the hot water tap in the bathroom. Whenever



hot water was turned on for a bath, this pipe heated the space behind the thermostat, causing the thermostat to be comfortably warm, and as long as it was warm it could not accurately sense the room temperature. This was corrected by moving the thermostat to another wall where there were no pipes or stacks.

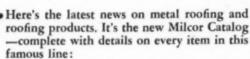
The beam ceiling was another mystery. It seems that (Please turn to page 156)



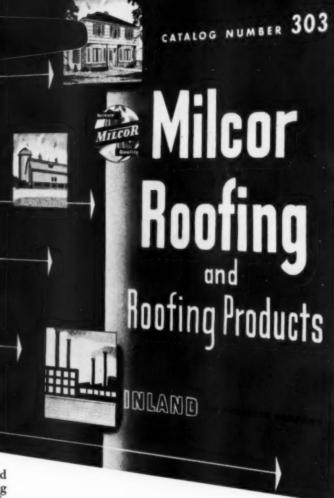


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AMERICAN ARTISAN, AUGUST, 1949 SHEET METAL SECTION

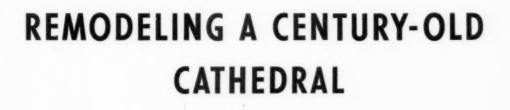
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THE SHEET METAL WORK

F. E. ELLIOT Riester & Thesmacher

One of the major modernization programs in Cleveland in recent years involved St. John's Cathedral. The story of the job is an interesting one and will be found in two parts. The sheet metal work is here and the air conditioning follows.



R IESTER AND THESMACHER, sheet metal manufacturer and contractor of Cleveland, secured the contract for the sheet metal work to be done in the remodeling of St. John's cathedral. Although the amount of metal to be used and the work to be done was not great, it was the type of work which called for a high standard of workmanship and installation.

Considerable Work on Spire

The largest part of the job consisted of reroofing the main spire of the church. As can be seen in the close-up view on the next page, this spire was octagonal, of herring bone design and had crockets on each of the hips. This interesting spire is 17 ft in diameter at the base and approximately 54 ft high. It tapers down to an 8 in. pipe which is fitted to receive the cross.

Copper of 20 oz weight was used throughout the spire and the work was designed so that the installa-

tion began at the top and progressed downward. The scaffolding was removed as the work descended. Section A-A on the next page is a sectional view of one of the hips on the spire and Section B-B shows the manner in which the copper panels were joined with slip locks. The bottom strip was inserted after the panels were in place. The flat deck at the bottom of the spire was formed of 4 lb lead and joined to the copper as indicated in Section C-C.

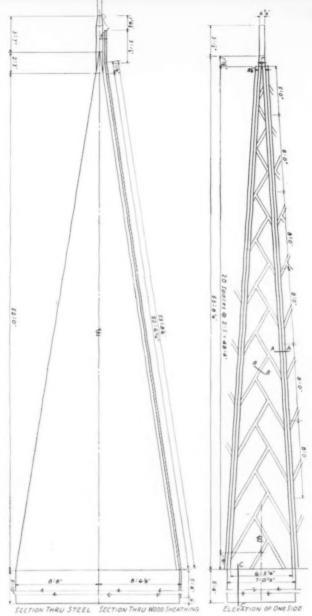
Other Details

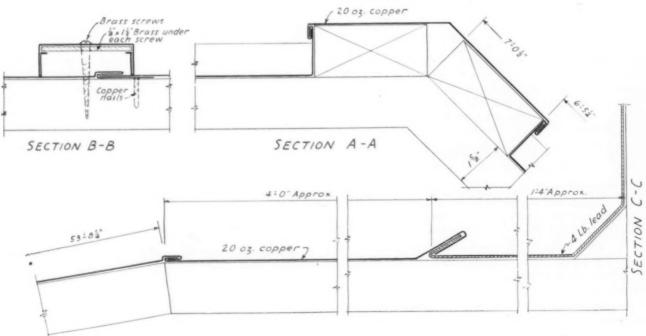
The louvers in the tower were made of copper and copper screens were placed behind them. Herring bone roofs were also installed on the small octagonal tower over the Baptistry, adjoining the side of the church, near the front, and on the bays projecting from the transepts, near the rear of the structure.

The remainder of the work performed on the job consisted of installation of copper gutters, conductors, flashing and through-wall flashing.



The photo above shows a closeup of the main spire while the detail drawing at the right gives a sectional view and the elevation of one side. Below are the sections indicated on the drawing and in the text.





American Artisan, August, 1949 Sheet Metal Section

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Remodeling A Century-Old Cathedral

How It Was Air Conditioned

WALTER E. RUDOLPH Erie, Pennsylvania

The heating and air conditioning of large buildings such as this cathedral is a good field for the industrial sheet metal contractor. Some of the components of the systems are so large that it requires experience with large jobs to handle them efficiently.

The Cathedral of St. John The Evangelist in Cleveland is one of the few churches of its size in this country that is completely air conditioned. The present status of this beautiful church is directly due to a disastrous fire which made necessary an extensive reconstruction and remodeling program that required two years to plan, three years to complete, and cost a total of \$2.5 million. The program called for work on the Cathedral, its integral Rectory, the Chancery, and the buildings of St. John's College. These buildings are known as the "Cathedral Group" and occupy an entire block northwest of the intersection of E. 9th St. and Superior Ave., in Cleveland.

Although the cornerstone of St. John's was laid 100 years ago, the recent remodeling program has made it one of the most modern diocesan sees in the United States. The Cathedral was designed with all the medieval splendor of French Gothic architecture and is 208 ft long. It covers 15,000 sq ft of floor space and can accommodate 1,500 worshippers.

The general contractor in charge of the remodeling program chose the Mannen and Roth Company, Cleveland, to handle the design and installation of the air conditioning and ventilating systems. An indirect, or split, system was to be installed and this company has made a specialty of air conditioning jobs of this size. The contractor on an installation such as this must be familiar with the fabrication and erection of large ducts and the handling of large volumes of air.

Six Units for Cathedral

In the Cathedral itself, six air conditioning units are used to provide year 'round comfort. As can be seen in the photos and drawings, conditioned air is discharged at the window sills through large grilles and return air grilles are located behind some of the pews at the rear

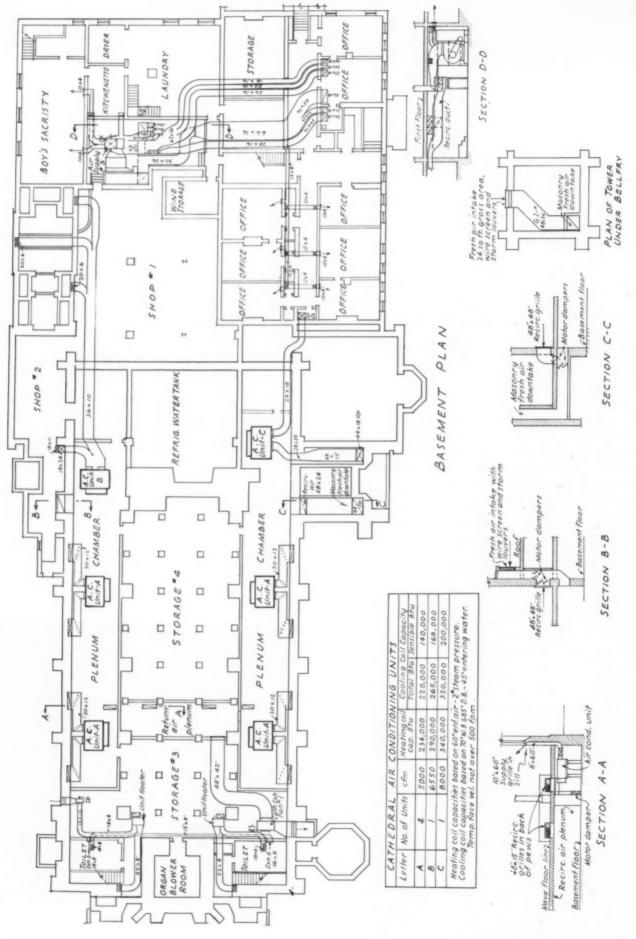
of the church. On the heating side, 60 F entering air was specified and the total heating coil capacity is 1,566,000 Btuh. Capacity of the cooling coils is 1,665,000 Btuh, based on 70 F wet bulb and 85 F dry bulb temperature. The chilled water used in the system is maintained at 45 F entering temperature. The six units have a total capacity of 36,550 cfm.

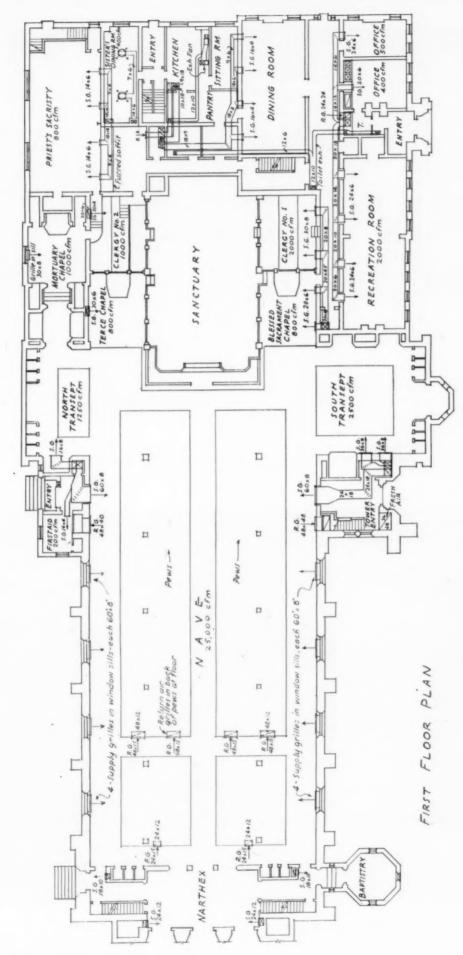
Cooling the Rectory

The Rectory area is located behind the sanctuary and includes a recreation room, the priest's sacristry, two dining rooms, a kitchen and offices. This area is heated by radiation, but is cooled by a central fan system. The cooling load of the Rectory is 450,000



Fig. 1 Air supply grille for the Narthex is shown here.





Plans indicate the scope of this installation. As described in the text, the Rectory area is heated by radiation but only the air distribution system is shown here.



Fig. 2 Return air grilles for the air conditioning system are located behind the pews, as shown



Fig. 3 Conditioned air, heated in winter and cooled in summer, is discharged from the grille in the window sill.

Btuh, based on 71 wet bulb and 86 dry bulb temperature. Chilled water enters the coils at 45 F. The cooling system of the Rectory has a capacity of 4,900 cfm.

The contractor encountered considerable difficulty in installing the air conditioning ductwork in the Rectory because it had to be fitted to the existing building. Since there were a number of runs to individual rooms and all ductwork had to be concealed it was an exercise in ingenuity to meet the job requirements.

The entire system is zone controlled and motor dampers are utilized to make it possible to recirculate

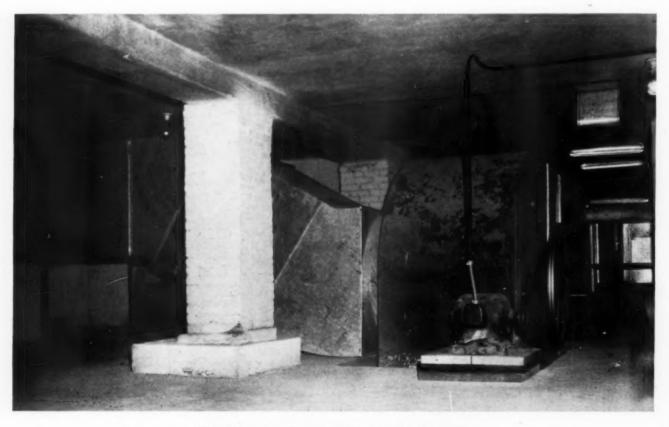


Fig 4 This is the main exhaust blower for the nave of the cathedral.

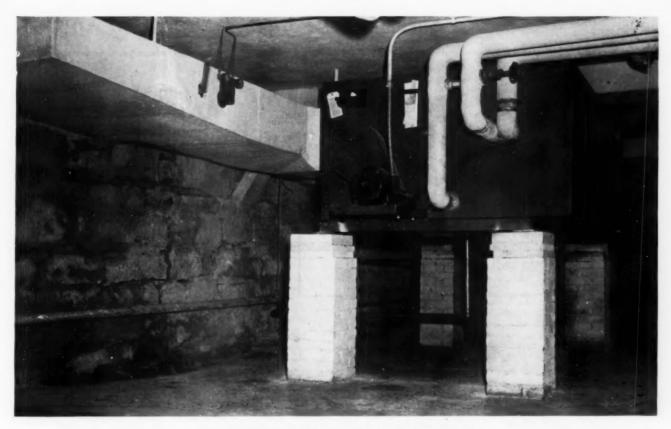


Fig. 5 One of the six air conditioning units which supplies air to the cathedral. They can easily be located in the basement floor plan.

the air in the system or bring in outside air in any proportion.

Chilled water for the cooling coils is provided by a large tank in the basement, about 6 by 28 by 30 ft. Freon refrigerant is pumped through the colls in the tank to chill the water to the required entering tem-

perature for the cooling coils.

An installation of this size and scope tends to prove that the potential market for air conditioning is far from being satisfied. It provides a fine field of operation for the large, industrial sheet metal contractor accustomed to handling big jobs.

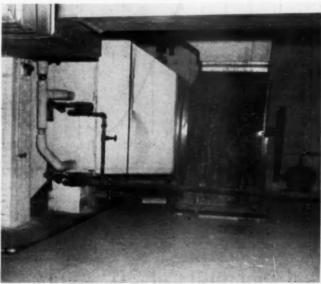


Fig. 6 This blower is for the cooling system for the Rectory.

The coils and filters are housed at the left.

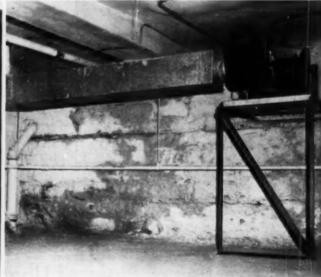
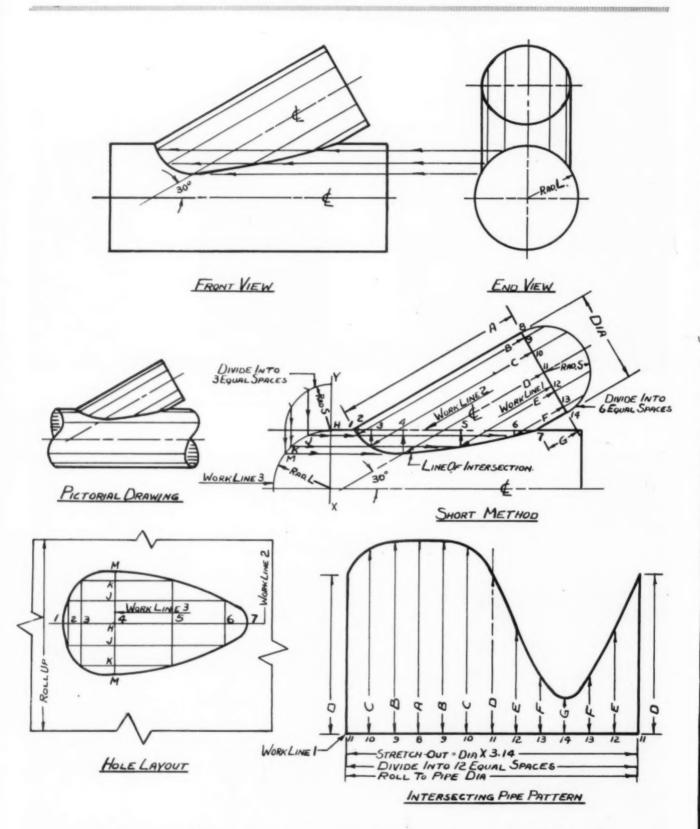


Fig. 7 An exhaust blower for the public restrooms.



Intersection of Pipes of Unequal Diameters at 30° Angle
-Hugh B. Reid

r

Pattern Development for

Intersection of Pipes of Unequal Diameter

At 30° Angle

HUGH B. REID Detroit, Michigan

First step—The short method drawing requires the
following steps:

- a) Draw the horizontal work line 2.
- b) Draw the center line D at the required angle.
- c) Draw the work line 1 at right angles to the center line D.
- d) With the point of intersection of D and work line 1 as a center and radius S, draw a half circle.

Divide the half circle into six equal spaces and, through the points of intersection, draw lines A, B, C, D, E, F, G as shown.

Draw the line marked XY. From the point of intersection of work line 2 and XY, using radius S, draw a quarter circle representing the smaller pipe.

From the intersecting point of XY and the center line of the larger pipe, draw a quarter circle to represent the larger pipe, radius L.

Divide the quarter circle marked radius S into three equal spaces and, through the intersecting points, draw lines down to intersect the larger pipe and then project them at right angles, as shown. Where J, K, and M intersect with B, C, D, E, and F project lines up to work line 2, as indicated by the arrows, thus establishing points 2, 3,

4, 5, and 6. Draw the line of intersection to complete the short method development.

Second step—Lay out the intersecting pipe pattern using the following steps:

- a) Draw a layout line representing work line 1, the length of the line being obtained by multiplying the pipe diameter by 3.14.
- b) Divide the line into twelve equal spaces and from the intersecting points draw lines perpendicular to work line I.
- c) Number the lines to correspond to the short method drawing and transfer the lines A, B, C, D, E, F, G, from the drawing to the layout.

Third step—Lay out the hole in the large pipe by these steps:

- a) Mark off divisions on work line 2 in the layout to correspond to divisions 1 to 7 on work line 2 in the short method development.
- b) Draw work line 3 through point 4 and step off H to J, K, M, on each side of work line 2.
- c) Draw horizontal lines through J and K and perpendicular lines through points 2, 3, 4, 5, 6.
- d) Through the intersection points draw the outline of the hole pattern.

Scientific Shop Layout (X)

ERNEST E. ZIDECK Sheet Metal Consulting Engineer

Two modern sheet metal shops are illustrated and discussed in this installment. One fabricates ductwork and fittings for heating installations and the other makes equipment for food stores, restaurants, ice cream parlors, and fountains, principally from stainless steel.

The first shop, Fig. 1 next page, has been established a quarter of a century in the heating business. What is new in the shop is its row of offices at the lower right in the drawing, and the spacious display room across the aisle from the offices. Low railings are located on both sides of the aisle, as shown, and a glazed partition admits the daylight which streams into the

offices through windows in the side wall thus helping to light the display room. The main reason for locating the display room next to the offices was to facilitate the sale of oil burners and stokers to customers brought into the offices. The partition separating the display room from the shop reaches up to the ceiling and banishes the noise and dust which attend any kind of sheet metal working.

In viewing the shop in Fig. 1 we must take into account the fact that the building is an old one, well lighted by windows in the side walls but bordered by another building at the rear and with only the entrance facilities shown at the front. The trucking

Fig. 1- Furnace, Oil Burner, Stoker Etc. Parts Shop.

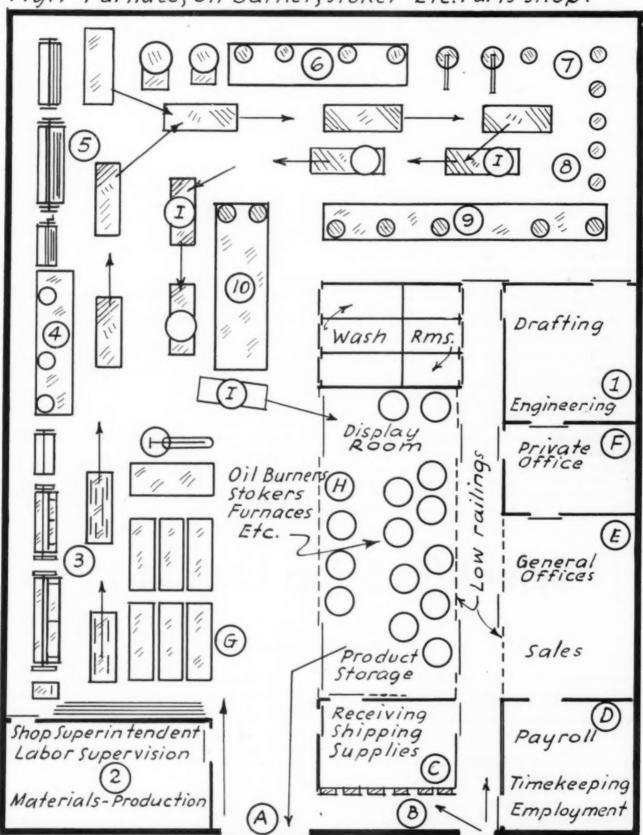
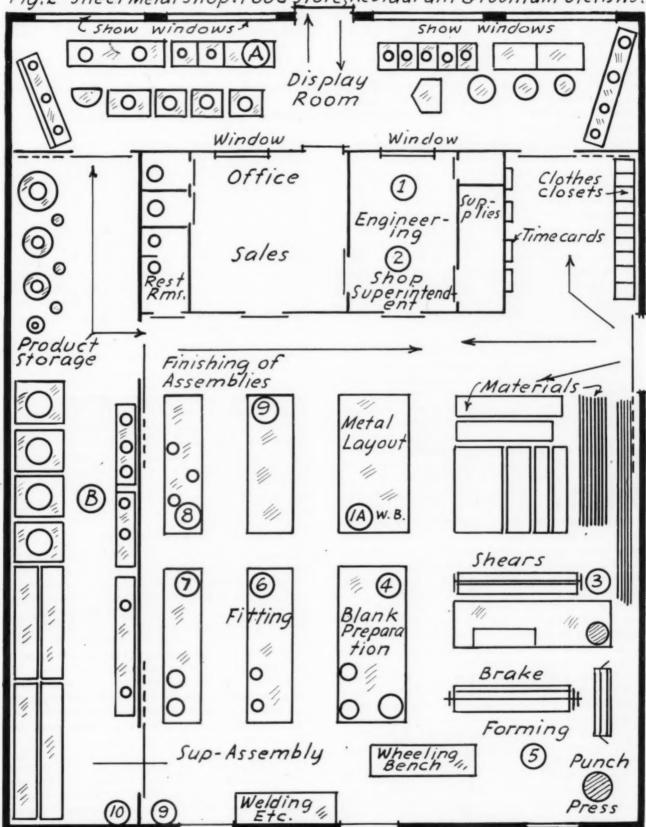


Fig. 2 - Sheet Metal Shop: Food Store, Restaurant & Fountain Utensils.



entrance A and the doorway B made it impossible to locate the display room at the front of the building without interfering with both the shipping and receiving of materials and the movements of employees to and from the shop. But, by erecting the partitions for the display room and the offices as shown, the shop was divided into two separate areas of activities, the one concerned with, and equipped for, sales; and the other given entirely to production. The shop worker enters at the door B, punches his time card and moves to the left, entering the shop proper without obstructing the activities going on in rooms C, D, E, F, and H. Office personnel enter through B and need have no contact with the shop.

Attention might well be paid to the arrangement of the offices C and D, both of which deal with the shop proper, the first in receiving, shipping and issuing of shop supplies; and the second handling employment, payroll and timekeeping. Both of these offices are contacting the shop and the other offices without interfering with the sales work and other activities of rooms E, F, H, or engineering. Washrooms are required by many city ordinances and here they are centrally located. They are accessible to the workers in the shop as well as the office personnel, salesmen and customers. The sliding doors into the display room are kept closed except when equipment is to be moved.

Sequence of Operations

The arrangement of the machinery and equipment in the shop is in accord with the principles set up in previous articles. Raw materials are stored at G near the entrance where they can be unloaded from an incoming truck without having the truck enter the shop. Three squaring shears and a rotary shear are located at J, handy to material storage. Wheeling benches I are used to move the sheets as they are manipulated through the shears. Sheared pieces are moved to the bench J, where they are prepared for forming at J.

In addition to a small and large brake, slip roll former and other smaller equipment not shown, there are in this area two punch presses, one used for hole punching and the other for small press work. At station 6 are stakes and small turning-beading machines for processing the parts coming from 5, for spot-welding, soldering or seaming at 7. At 8 and 9 the parts arriving from 7 are finished and assembled, with wheeling benches carrying the assemblies to 10 for completion. As indicated in the drawing the operations begin at the material storage and progress in their logical sequence, along the walls of the shop to the farthest corner of the shop where welding and soldering is performed. From there the operations move forward into the center of the shop, where there is ample space for larger assemblies, and terminate at 10, in proximity to both the display room and the shipping area. The wheeling benches are often used, aligned together, for erecting the larger assemblies.

This production sequence has the advantage of moving material from the initial cutting to each successive stage of operation, without the worker having to cross the shop to hunt for a machine or piece of equipment to finish a particular operation. If the equipment is arranged according to the sequence of

operations, the product will continually travel forward toward completion.

The shop in Fig. 2 is a departure from the conventional sheet metal shop. It was erected to display equipment now in demand for food stores, restaurants, ice cream parlors, fountains and establishments selling perishable foods. Cleanliness and appearance of the equipment is just as important, perhaps more important to the customer, as the operating characteristics. When the public sees attractive modern equipment of this type, in establishments serving food and refreshments, business volume is generally due to increase. Therefore, a company manufacturing such equipment aids its own business by showing the passing public the new and attractive developments in the line.

Selling the Public

This knowledge was the main reason for the arrangement in Fig. 2, where we see the entire front of the building reserved for display, with four large show windows permitting the passing public to view the products on display. These exhibits are selected pieces of gleaming equipment most likely to attract and impress people. The owners of this sheet metal shop decided that if they showed the public their products, people would talk about them and the word of mouth advertising would bring business men in to buy equipment they needed.

Therefore, the area marked display room in the drawing is given all due prominence, is attractively finished and kept in good condition, with the products displayed all attractively arranged. The less showy products, such as ice containers and similar equipment, are kept in the store room B which may be entered from the display room for customer accommodation, but from which the products are delivered directly to trucks for shipment. This room is also used for final assembly of the product, making it ready for delivery to the place of installation. In this room are also kept parts and utensils obtained from outside sources.

Office Arrangement

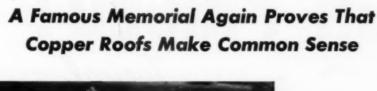
Looking at the drawing we see that the offices are located deep in the shop, receiving daylight through the glass in the partition facing the display room. This partitioned area includes offices for management, sales, engineering and the shop superintendent, as well as a supply room and rest rooms. These are all accessible to office personnel, customers and shop workers. The men in the shop have an area reserved for changing clothes as well as a lunch area. The front door into the display room is a double door, wide enough to handle the smaller pieces of equipment but shipments are actually loaded onto trucks entering the shop proper, through a sliding door seen at the right of the truck entrance.

The shop itself is a self-contained unit, with daylight entering the windows at the rear of the building. A wide passage is maintained between the office partition and the shop equipment, for delivery of goods from the store room to the truck. Material supplies are generally received by truck and stored in the area near the truck entrance, with the shears 3 ad-

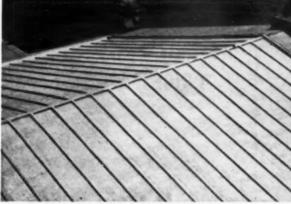
(Please turn to page 168)

FOR ROOFING THAT MUST ENDURE...

Always choose Revere Copper!



The George Washington Masonic Memorial... national shrine each year for thousands of visitors.



Finished double pitched roof on front.



Back roof, where double pitched roof and dome roof meet.

N Alexandria, Virginia, Gichner Inc. of Washington has been constructing the roof on a truly beautiful and stately building . . . the famous George Washington Masonic Memorial.

Because the roof obviously had to be permanent, enduring and impressive, common sense demanded copper. Thus, more than 13,000 pounds of Revere lead-coated copper were specified for the batten seam installation.

Regardless of whether it's a small or large job on roofs, flashing or gutter, Revere copper and the



Installing caps on batten as roof nears completion.

Revere manual on sheet copper installation will help guide you to finer, more durable construction.

Revere sheet and roll copper, lead coated copper and other Revere quality materials are available through leading distributors. A Revere Technical Advisor stands ready to consult with you without obligation.

For 50 years, Gichner Inc. has installed Revere Copper on many of Washington's most impressive buildings.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801 230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.

WHO SAYS JANITROL IS HIGH PRICED?

There are some dealers who think Janitrol is a high priced line. Our competition can't criticize Janitrol's advanced designs, our thorough workmanship and our established reputation for proven, quality products. But, the words have gone around, "Sure, Janitrol is fine equipment but their prices are high."

You may have been told this...
you may have believed it without actually checking not only list
prices but also your installation and service costs.

We believe it is important for you to know the real facts... that you should know how other dealers are capitalizing on the great sales appeal of gas heating with the nationally known and advertised Janitrol Gravity Furnace... at new low prices that enable you to bid competitively for replacement jobs and new houses.

While Janitrol Gravity Furnaces are competitively priced, your installation work is simplified, so that your "ready-to-heat" costs are in line... you gain the advantage of offering a famous name product and assurance of customer satisfaction, which is your best asset for your continued success.

Ask your Janitrol representative for new, revised Gravity Furnace prices and typical costs of installation work, or if you prefer write us for full information.

SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO.

A MILE OF JANITROL GRAVITY HEATED HOMES



These homes, built on Bernhardt Drive, Snyder, N. Y., under the Veterans Housing program, are typical of the many projects using Janitrol Gravity Furnaces exclusively to provide automatic low-cost heating comfort.

Typical economy installation in recent building project. Note Control Cover (optional equipment) is not used in these installations to further reduce costs.



PLENUM AND TOP FRAME ASSEMBLY— Offers simplified means for attaching warm air outlets. Designed to fit S-hook assembly connections. (Optional equipment)

FLUE COLLAR, DRAFT HOOD—Assures proper draft control for safe and efficient operation.

ALL WELDED COMBUSTION CHAMBER—
18 gauge, steel design assures high heat transfer, gas-tight joints, and positive, even heat distribution.

RADIATOR ASSEMBLY—Seam-welded construction. Internal baffling insures maximum gas travel for economical operation.

FRONT CASING PANEL WITH CONTROL COVER SUPPORT BRACKET—Positions over burner duct. Interlocking design speeds correct assembly, no bolts or screws are used.

CONTROL COVER ASSEMBLY — Provides attractive, easily removable, tamper-proof housing for controls and burner. (Optional)

FAMOUS JANITROL FLAME RETENTION BURNER AND CONTROL MANIFOLD—Quiet, efficient, with wide adjustment range. Completely automatic—maintains even temperatures. Interlocking Pilot Support Bracket correctly positions pilot for proper ignition.



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Michigan

A recent news letter from the Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association, Inc., discusses the allocation of gas heating installations by the Consumers Power Co.

N. J. Biddle, secretary, reports that approvals for 12,000 additional space heating units have been released. George Lubahn and Mr. Biddle discussed the allocation situation with Wilson Arthur, vice president and general manager of Consumers Power Co., and the association wishes to acknowledge the company's fine cooperation.

Mr. Arthur said that although the company has a few hangover installations which they will be obliged to make, they are not going to enlarge their installation personnel, but will rely on contractors to make the installations on jobs which the company has sold.

In another section of the same letter, the secretary mentions the fact that there is some opposition among contractors in Detroit to following the provisions of the national electric code. This provides that all remote control apparatus shall be Class 1 circuit. Adhering to the code would mean obtaining a \$2 permit and hiring a licensed electrical contractor to install work.

Limit controls in Detroit have for years been almost entirely low voltage controls, and according to records of the Safety Engineering Office, there has been no serious trouble as a result of this type of wiring.

It is expected that a hearing will be held before final action is taken in regard to compliance with the national electric code in Detroit.

North Carolina

The benefits of belonging to a local association are lauded by members of the Asheville Sheet Metal & Roofing Contractors Association, in the May issue of "The Carolinas Roofer." The association, which has been organized for approximately four years, includes all of the leading shops and many of the smaller shops in Asheville on its membership list.

The group holds monthly meetings at which every member feels free to bring up problems which he has encountered in the trade. These are then opened to discussion so that each member may contribute ideas gained through experience in his own shop operations.

The members benefit greatly from the exchange of ideas thus afforded, and find that their meetings lead to closer cooperation among local shops. During the war years, exchange of ideas was devoted to discussion of the best materials available and best ways to secure hard-to-get supplies. Recently, the group has found it beneficial to compare ideas on the most efficient

ways to combat, or at least to meet, falling prices in this postwar adjustment period.

The Asheville association heartily recommends that cities which do not now have a sheet metal and roofing contractors association, seriously consider the formation of such an organization.

New York

The provisions of the New York Disability Benefits Law which will become effective next year are plainly interpreted for members of the Roofing and Sheet Metal Crafts Institute, New York, in the June bulletin issued by the association.

The purpose of the new law is to provide cash insurance benefits on a compulsory basis to eligible employees who are unable to work as a result of non-occupational injury or sickness. This is distinguished from Workmen's Compensation, which covers injuries on the job. The new law provides weekly benefits to replace, in part, the loss of wages due to non-occupational disability.

As of July 1, 1950, provision must be made for payment of benefits to all employees employed in any trade, business or occupation by an employer of four or more employees. Employers and employees will (Please turn to page 116)

Coming Events

Sept. 25-Oct. 2—Houston Chapter, Associated General Contractors, 2nd Annual Houston Construction Industries Exposition. Sam Houston Coliseum, Houston, Texas. Loy W. Duddleston, General Manager, Exposition Policy Committee, 2103 Crawford St., Houston 3, Texas.

Nov. 14-18—Refrigeration Equipment Manufacturers Association, 6th All-Industry Refrigeration and Air Conditioning Exposition. Atlantic City Auditorium, Atlantic City, N. J. George E. Mills, Show Director, All-Industry Exposition, 1346 Connecticut Ave., N.W., Washington 6, D.C.

Jan. 23-27, 1950—American Society of Heating and Ventilating Engineers, Southwest Air Conditioning Exposition of the International Heating and Ventilating Exposition. State Fair Grounds, Dallas, Texas. E. K. Stevens, Associate Exposition Manager, Grand Central Palace, New York City.

Feb. 2-3, 1950—Sheet Metal and Warm Air Heating Contractors Association of Indiana, Inc., Annual Convention. Hotel Severin, Indianapolis, Ind. Frank E. Anderson, Secretary, 439 So. 17th St., Terre Haute, Ind.

Hard-Hitting Salesmanship is Theme of National Warm Air Association's Summer Meeting in Chicago

WITH posters and convention badges featuring sales slogans, special emphasis on sales and promotional activities was injected into the mid-year meeting of the National Warm Air Heating and Air Conditioning Association held in the ballroom of the Edgewater Beach Hotel, Chicago, June 21-22. During the committee meetings preceding the convention, the Publicity and Merchandising Committee received a report by the association's headquarters staff outlining the results and progress of the publicity program authorized at the December 1948 meeting. Gene Brown, Buffalo, New York, later reported to the convention that the publicity program opened on May 1, with weekly releases scheduled to daily newspapers of 100,000 circulation and over. Three releases are issued each week, exclusively for morning, afternoon, and Sunday papers. Copy is geared to the season, promoting the benefits of warm air heating, continuous air circulation, and cleaning and inspection services rendered by the dealers of the industry.



Guy Voorhees receives book of testimonial letters from Robert Waalkes, MSC.

Mr. Brown reported over 8,500,000 readers have been exposed to warm air heating publicity and that editorial material is now being developed by Randall A. Nelson, in charge of the consumer publicity program, for submission to home and architectural magazines.

Within the industry, Mr. Brown reported that the value of an industrial relations department, under the supervision of James M. Martin, has been demonstrated. Dealers have become familiar with the association's manuals, the *Indoor Comfort* Conferences, Continuous Air Circulation programs, and dealer membership has risen to over 1,350.

Heating Large Structures

L. S. Redford, Saginaw, Michigan, discussed "Marketing Opportunities for Warm Air Heating in Commercial and Industrial Applications," pointing out a new, profitable sales field for warm air heating that has been neglected by the industry. He disclosed statistics showing the extensive markets open to warm air heating in non-residential structures and deplored the lack of competition in this field.

Experiences of companies installing large equipment have proved that large buildings can be heated satisfactorily with warm air. It has also been shown that these installations save money for the client, and at the same time are profitable business for the contractors. Mr. Redford suggested an active interest in commercial and industrial heating would assure for the industry a necessary increase in sales volume to offset the present drop in residential construction.

Large buildings, he said, are a profitable source of business because they increase the rate of capital turnover and do not require expanded facilities.

Mr. Redford appealed for association support of a program to encourage the use of warm air heating in large buildings and expressed his belief that the industry could take a large share of this market as it has done in the residential field. He concluded his talk by paraphrasing the posters of the convention with "wet heat will have a tough time in '49."

Warm Air Research

On Tuesday morning, President Atlee Wise called the meeting to order and introduced Robert W. Roose, special research assistant, University of Illinois, who discussed the results obtained from tests in Warm Air



R. L. Towne



L. S. Redford



Mr. and Mrs. Gene Brown, Buffalo, Ralph King, Chicago and Frank Gibbons, Cleveland, enjoying the convention.

Research Residence No. 2 during the heating season 1948-49. He compared the performance of both conventional and ceiling panel heating with previous tests of the same systems with a heated basement.

Both systems showed greater temperature difference between floor and ceiling with an unheated basement. However, a comparison between the two systems showed similar differentials for either the unheated or heated basement. From the tests conducted, Mr. Roose concluded that the two heating systems performed satisfactorily and had approximately the same characteristics with either a heated or unheated basement. In addition, the extra fuel required to heat the basement was relatively small compared to the additional space heated.

The next speaker, Norman A. Buckley, special research assistant, also of the University of Illinois, explained the performance of blowers attached to warm air furnaces and proposed an arrangement for determining blower characteristics. He said the rating of a blower and furnace combination is individual to each combination and that the application of blowers manufactured by different companies were found to have different characteristics.

Golf Tournament

Over 100 persons attending the convention journeved to Olympia Fields Country Club on Tuesday afternoon where the annual golf tournament was held under the supervision of T. Reid Mackin, Chicago, chairman of the Chicago Convention Committee. Thirty-five prizes were distributed both to golfers and non-golfers who attended the outing. Ralph W. King. Chicago, chairman of the subcommittee in charge of the golf tournament, was master of ceremonies.

On Wednesday morning, June 22, Frank L. Meyer, Peoria. Illinois, chairman of the Research Advisory Committee, announced the construction of Warm Air Research Residence No. 3, being built by the association at Champaign.

Morris E. Childs of the University of Illinois later described the residence layout and heating apparatus to be installed. The house will be a typical 5-room basementless structure of standard frame construction.

It will have a wood shingle exterior. Overall dimensions are 32 ft by 24 ft, providing 778 sq ft of floor area. Floor construction will consist of a 4 in. gravel fill and a 4 in. concrete slab with a vapor barrier between the gravel and the slab. The slab will be insulated with 1 in. thick, rigid insulation, located between the slab and the foundation and extending downward 12 in. from the top of the slab.

Plans provide for testing of 3 types of systems during the 1949-50 heating season. One is a simple gravity system with high sidewall registers in each room and two return air grilles on the utility room walls. The second heating system will be a forced air system using the same ductwork as with the gravity system and the third test will be conducted with a forced warm air system and low sidewall registers in each room and three sidewall return air grilles. These three systems will be operated alternately over two-week periods throughout the season so that comparative



C. W. Nessell, Chicago, speaking at the convention.

performance may be studied under all types of weather conditions.

"Results of the experiments conducted," concluded Mr. Childs, "will be published upon completion of the



At the convention party, left to right, Charles Hess, Massillon, Ohio, and Thompson Morrison and Al Galaba, both of Cleveland, Ohio.

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1949-50 heating season and made available to the industry."

Clarence Grandstaff, Elyria, Ohio, in the absence of W. D. Redrup, chairman of the Installations Codes Committee, reported on the activities of his committee. He told of revisions to Manual No. 9 and the new CAC short form. Mr. Grandstaff also announced the proposed publication of Form 5 for use as a guide for perimeter heating of concrete slab floor houses.

In the absence of Dean Lorin G. Miller of Michigan State College, East Lansing, Michigan, chairman of the Technical Education Committee, Robert J. Waalkes, also of Michigan State College, delivered a report on the short course, held in East Lansing, March 21-24. Mr. Waalkes stated that 150 heating men attended and that three major problems were covered during the school.

In his address to the convention, C. W. Nessell, Chicago, Illinois, chairman of the Low Cost House Heating Committee, reported investigations and testing conducted by his committee of the heating systems in 12 low cost houses. This investigation led to the formulation of the new Form 5, which will soon be published by the association. Mr. Nessell indicated the need for continued investigations since the problems faced in heating low cost houses are the same as those that appear in more expensive houses of this type of construction. He indicated a desire on the part of his committee to continue the investigations during the coming heating season in order to obtain sufficient data in all parts of the country for satisfactory heating design of low cost houses.

Asks Clearer Advertising

Carl Lans, director of the Technical Division, National Association of Home Builders, presented "Home Builders Select the Heating Plant." Mr. Lans ques-

(Please turn to page 144)

Association Activities . . .

(From page 113)

share the cost of the plan. Starting on the above date, each employee contributes $\frac{1}{2}$ of 1 per cent of his wages, not to exceed 30 cents per week. This may be collected through payroll deductions. The balance of the cost is paid by the employer, whose cost may change from year to year depending on the extent of sickness and other factors.

The cost to the employee cannot exceed six cents per day and in many cases will be less. In return, the employee may receive benefits for up to 13 weeks at a rate of \$10 to \$26 per week.

Benefits are payable as follows:

- 1. Benefits are payable for totally disabling non-occupational injuries or illness that occurred during employment or during limited periods of unemployment with certain exceptions.
- 2. Benefits are payable on the eighth consecutive day of disability, for any period of disability during which the employee is under the care of an authorized physician up to a maximum of 13 weeks in any 52 consecutive weeks. The amount of weekly benefit is one-half of the employee's average weekly wage, with a minimum benefit of \$10 per week (not to exceed the actual average wage) and a maximum of \$26.

Conditions under which benefits are not payable: 1. No benefits are payable for first seven weeks of disability during unemployment due to industrial controversy, nor

2. During the first seven weeks after loss of employ-

ment due to misconduct.

- Benefit payments are not made to claimants who have voluntarily quit work and have withdrawn from the labor market.
- No benefits are payable for periods for which unemployment insurance or workmen's compensation benefits are paid.

Provisions are also made in the law for an unemployed worker who is prevented by injury or sickness from receiving unemployment compensation. A covered employee who becomes unemployed continues to be covered for disability benefits for a period of at least four weeks and if he was in a job covered by unemployment insurance, he is covered for a period of 26 weeks after his employment ceases. For this period, he will receive the same disability benefits as he would have received had he been employed.

Any employer may broaden the scope of the benefit plan or change it in any way that he may desire, providing that benefits to employees are at least as favorable as those provided by the law.

Old Timers

The Old Timers' Club of the oil burner industry held its annual golf tournament on July 15 at Itasca Country Club, just west of Chicago. Among the old timers who enjoyed 18 holes of golf and attended the dinner was James W. Owens, Chicago, Ill., who is national chairman of the club. Charles Bendix, also of Chicago, was in charge of the outing.

The golf trophy was won by William F. Klockau of Rock Island, Illinois.

EQUIPMENT DEVELOPMENTS

Attic Fan Package146

High volume attic fan package combines two 22 in. three-bladed fans for NAFM rating of 6,200 cfm. Power is supplied by 1/3 hp motor through single belt drive. Attic fan, resilient mounting, felt sealing strips, automatic ceiling shutter, automatic electric timer, safety fusible link, and illustrated instructions comprise the package.



Fan discharges vertically and requires no vent boxes or fittings. It fits directly into 29 x 49 in. ceiling opening, framed with headers. Special features include automatic electric timer built into fan casing, and hinged automatic ceiling shutters to facilitate cleaning of fan and shutters from floor below.

Viking Air Conditioning Corp., 5600 Walworth, Cleveland 2, Ohio.

Ceiling Outlet147

Diffuser type ceiling outlet is available in five popular sizes: 6, 8, 10, 12, and 14 in. diameter. Units are designed primarily for use with standard package heating systems for residential heating installations.



Diffuser rings are set at proper angle for the most efficient performance. Furnished complete with installation flange, sponge rubber gasket seal, and baked-on prime coat finish.

Hart & Cooley Mfg. Co., Holland,

Use Coupon on This Page

Timer-Thermostat148

New timer-thermostat can be used in connection with any space or unit heaters, central, wall, or floor furnaces equipped with automatic control systems. Provides accurate remote control of both day and night temperature periods.

Features include two-wire, bi-metal construction, with snap action and drum dials. Sensitive to radiant or connected heat. Any temperature between



50 and 90 F may be selected for night period; clock mechanism automatically returns heating system to preselected day temperature in morning.

Two models are available: one providing external day and night settings; the other, external day setting and internally adjustable night setting.

Timer is available as single unit or within a packaged set of complete automatic control system.

General Controls Co., 801 Allen Ave., Glendale 1, Calif.

Gas Fired Conditioners . . . 149

Gas fired winter air conditioners, Series J-100 and Series J Hi-Boys,



feature alloy steel construction, and Victor heat radiating fins.

J-100 units measure 56 in. high (less plenum); 26 in. wide; 50½ in. long. Rated at 80,000 Btu output.

The Hi-Boy is constructed with

one side access to flue, burner, blower and filter for corner or wall installation, and with side or platform filter unit. Btu output ratings for two Hi-Boy models are 88,000 and 76,000 respectively. Dimensions are 741/4 in. high (less plenum); 26 in.



wide; 32 in. long. All units are AGA approved for natural, manufactured, or mixed gas.

Hall-Neal Furnace Co., 1322-32 Capitol Ave., Indianapolis 7, Ind.

MAIL THIS NOW! -

We will ask the manufacturers to send full particulars about the products and literature mentioned. Be sure to circle the items you want. Equipment Developments 150 149 154 148 151 152 153 163 155 156 157 159 160 New Literature 286 287 288 289 290 291 293 296 297 298 299 300 Manufacturer lobber Name Company Address: AMERICAN ARTISAN, 6 North Michigan Ave., Chicago 2, Illinois

EQUIPMENT DEVELOPMENTS

Use Coupon on Page 117

Convertible line of winter air conditioning furnaces features adaptability of units to either oil or gas.

Loboy basement model is 53 in. high and, with gas burner, has input of 100,000 Btu. AGA approved for natural, manufactured, mixed, or LP gas. When equipped with power vaporizing or gun type pressure oil burner, the Loboy has a



bonnet rating of 80,000 Btu.

Convertible Hiboy model, only 2 ft square, is also available. Rated at 60.000 Btu input.

Century Engineering Corp., Cedar Rapids, Iowa.

Redesigned pickup cart, called the Gardeneer, offers rugged overall construction, greater rigidity in the body, and more attractive styling. Recommended for farm and commercial uses as well as for use around the home.



Spacious hopper holds 23/4 cu ft. Front tilts to ground for easy loading and unloading. Equipped with

two rubber tired wheels and two backstands to maintain stability when cart is at rest. Constructed completely of steel, the cart is finished in durable baked enamel.

Inland Steel Products Co., P.O. Box 393, Milwaukee 1, Wis.

Hy-Duty blower, 5 in., single outlet type, was developed primarily to fill demand for blowers smaller than the $8\frac{1}{2}$ in. For use in work

shops, for evaporative coolers, for distributing furnace heat, and in many other applications. Direct connected to moisture proof, 1/30 hp, 115 v, 60 cycle, single phase motor,



equipped with 16 in. leads. Blower weighs about 9 lbs and is easily portable.

Standard unit has bottom horizontal discharge. Variations from standard, such as direction of rotation, location and angle of discharge, belt drive, are available on quantity orders.

Schwitzer-Cummins Co., 1125 Massachusetts Ave., Indianapolis 7, Ind.

Combination Snips 153

Tri-Snip is designed for notching and nibbling, double cutting, and dovetailing. Notches can be cut with minimum amount of distortion, burring, or bending of the blank; contours and curves can be cleanly nibbled for a neat job.



In double cutting, the snip cuts free of work on each complete stroke, cutting the burr off completely.

When used in dovetailing, it makes both cuts and bends lug on same stroke. Lug is 5/32 in. wide and can be cut $1\frac{1}{4}$ in. deep.

Roto-Table Co., 2605 E. Third St., Dayton 3, Ohio.

Utility Room Furnace 154

Gas fired winter air conditioner of the highboy type occupies only about 2 sq ft of floor space, is only 4½ ft high, yet is rated at 57,600 Btuh at bonnet.

Recommended as an effective conditioner for any installation where



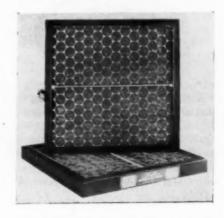
space is at a premium. Important features are twin blowers which improve heat distribution by circulating air directly up both sides of heat exchanger.

Cabinet is especially treated to combat dampness, finished in twotone blue baked enamel.

Armstrong Furnace Co., Columbus, Ohio.

Disposable Air Filter 155

Impingement type disposable air filter is made in 14 standard sizes for use on all types of forced air heating, ventilating, and air conditioning systems. According to the manufacturer, the filter element is composed of long, fine glass fibers, firmly bonded together with a high temperature bonding agent, and coated with special fire resistant, dirt catching adhesive. Smaller diameter of the fibers is said to enable them to hold more dust.



Filters are made in all sizes for use in home heating equipment and in commercial and industrial filter banks.

Glasfloss Corp., 155 E. 44th St., New York 17, N.Y.

Multi-purpose cam press is said to be perfect bench tool for punching, riveting, forming, sizing, upsetting, bending, drawing, staking,



nibbling, assembling, and all other small press operations requiring accuracy and precision.

Press has a rated capacity of 1½ tons pressure near bottom of stroke. It features hardened steel cam keyed to steel shaft. Adjustable stops for

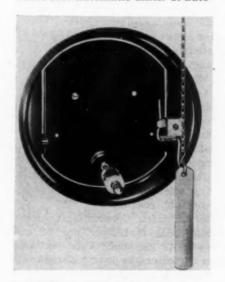
lever accurately maintain length of stroke desired.

Accurately machined bed is 3% x 4 in.; lever length is 10 in.; die space stroke-up is 3% in.; hole in slide for punch is % in.; length of stroke, % in. Weight, 30 lbs. net.

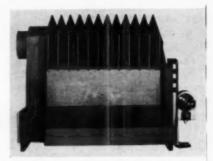
Marshalltown Mfg. Co., Marshall-town, Iowa.

Temperature Control 157

Automatic heating control system with barometric draft control is designed to transform hand-fired furnaces into automatic units. It auto-



matically regulates chimney drafts and holds stack temperatures to a



High Capacity Furnaces . . . 158

Hi-Cap series of warm air steel furnaces is manufactured in sizes to cover complete range of ratings from 350,000 to 1,000,000 Btu. Units are designed expressly for installations in garages, schools, churches, and larger public buildings.

Heat exchanger is of V-type accordion construction to eliminate expansion noises of higher temperature surfaces. All parts are made of 3/16 in. steel plate with double welded seams both inside and out on all surfaces subjected to radiant heat.

Blower may be placed on either side of furnace without any loss of air flow. Blower and furnace casings are constructed to permit use of an intermediate cooling system section between them.

Exceptionally fine heat transfer is said to result from the elevated installation of the furnace proper, which permits air flow to all sides of the unit.

To eliminate expense of breaking out and rebuilding walls when installations are made in old buildings, the heat exchanger can be furnished knocked down so that all parts will pass through a 36 in. door.

Syncromatic Corp., 1141 Tenth St., Watertown, Wis.

safe 410 degrees. Advantages of its use are said to be longer life for heating plant equipment, and lower maintenance cost.

The system is composed of a heat anticipating thermostat, a bonnet limit control, damper regulator, and patented barometric draft control. Only one electrical connection is necessary.

Automatic Products Co., Plant No. 3, Milwaukee 10, Wis.

Industrial Heaters159

Practical heating unit which can be easily moved from spot to spot is available as complete package for industrial heating. Two sizes are 300,000 Btuh and 550,000 Btuh output. Said to burn oil or gas at 82-86 per cent efficiency.

Units feature four adjustable lou-

vered discharge nozzles for full lateral 360 deg coverage from floor to working level, to discharge warm air directly to area to be served. Equipped with combustion chamber of welded construction, axial flow forced draft fan which can be used for



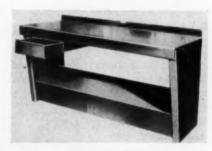
circulating cool air in summer.

Completely automatic, light in weight, and small in diameter. Casing is enameled; metal trim is aluminum or aluminum finish.

Thermobloc Div., Prat - Daniel Corp., East Port Chester, Conn.

Steel Work Bench......160

Extra strong work bench, made for heaviest shop and industrial uses, has 12 ga steel top, and features streamlined design. It measures 6 ft long, 34 in. high, and 28 in. deep. Small metal working machines can be attached on top of the bench and operated with ease.



Electrical knockouts for double outlets are provided in the front of the legs. Other features include back rail; drawer mounted on rollers; full base to floor; concealed holes inside flange of end panel to permit bench to be bolted to floor. Standard finish is olive green enamel; other colors optional.

Equipto Div., Aurora Equipment Co., Aurora, Ill.

EQUIPMENT DEVELOPMENTS

Use Coupon on Page 117

Shallow Floor Furnace....161

Shallo-well oil fired floor furnace, Model 0-70 Super, measures only 34 in. overall height. Rated at 70,000 Btu, furnace embodies aluminized steel in combustion assembly and stainless steel in the burner.



Model is completely automatic with forced draft fan for highest burner efficiency. Finished in attractive baked enamel finishes.

Other Shallo-well models include units rated at 60,000 and 50,000 Btu respectively. Latter model is designed for natural draft with manual controls; automatic controls and forced draft fan are available as optional equipment.

Oran Co., 2232 S. Third St., Columbus 7, Ohio.

Fuel Oil Filters......162

Fuel oil filters which are easily installed as a permanent part of oil burner installations are designed

to remove any dirt, water, gum, scale, or rust that may accumulate during transfer or storage of fuel oil. Filter can be installed either close to the tank or the burner with equal ease;



instructions are included in the filter box. Replacement cartridges are available for quick servicing.

Filter F1210, shown in cutaway view, is designed for 2,000 gal per year capacity. Overall height is $5^{-1}\frac{1}{16}$ in.; outside overall diameter, $3\frac{1}{2}$ in.; weight, $1^{-3}\frac{4}{16}$ lbs each. Packed 6 to a carton.

Four other models are available for burners requiring greater filtering capacity.

Fram Corp., Providence 16, R. I.

Oil fired warm air unit, Model 1100-0, is furnished factory assembled except for burner and controls.



High pressure flange-mounted burner has capacity rating of 110,000 Btu, 1200 cfm at 1.0 gph input. Unit measures only 26 in. wide, 52 in. long, 52 in. high.

Series 0 also includes a model with capacity of 140,000 Btu, 1200-1600 cfm at 1.3 gph input. Dimensions are 30 in. wide, 58 in. long, 52 in. high.

All units are furnished with bottom plate eliminating need of grouting at floor line.

The Hess Co., 1855 S. 54th Ave., Chicago 50, Ill.

Aluminum Fittings164

Aluminum fittings for pipe fixtures are said to cut installation time up to 80 per cent. Called Nu-Rail, these fittings consist of three basic units from which 14 different arrangements can be made, plus a modified cross, floor and wall flange, and end plug.

Uses include stair and guard rails, portable scaffolds, and porch canopies among others.

Descriptive literature and complete table of engineering specifica-



tions, including list of weights and sizes, are available.

Reynolds Metals Co., 2500 South Third St., Louisville 1, Ky.

Portable Sprayer165

Portable paint spray unit, Spraymaster SM-25, works equally well with paint, enamel, lacquer, insecticides, or moth proofing solutions.



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Sprayer is motor driven with compressor of twin-cylinder type driven through steel and fiber gears. Equalizer storage tank is of ample capacity to maintain average spraying pressure of approximately 25 lbs. A 10 ft rubber hose connects to 16 oz capacity aluminum container and spray nozzle, adjustable for different liquids.

Complete unit weight, 7½ lbs; descriptive literature is available.

Portable Electric Tools, Inc., 255 W. 79th St., Chicago 20, Ill.

Gas Fired Furnace 166

Two winter air conditioners have been added to a line of gas fired furnaces. Models have an AGA input rating of 93,750 Btu and 109,375 Btu respectively, and are designed

for easy installation in utility rooms, closets, and basements.

Standard equipment includes automatic pilot valve, manual main control and pilot valve, gas pressure regulator, and magnetic type solenoid with shut-off controls



for LP gases. Combustion chamber and heat exchanger are of one piece 12 ga steel. Top discharge with bottom back or side cold air return is provided.

Norge Heat Div., Borg Warner Corp., Detroit 26, Mich.

Convertible Heating Equipment Key to More Sales with Less Inventory

E. J. LATTNER, President Century Engineering Corporation Cedar Rapids, Iowa

One of the problems besetting heating dealers is the matter of inventory. Trying to cover all contingencies would normally require a prohibitive amount of stock both from the cost and space standpoints. No dealer likes to turn away a prospect because he has not the type or size equipment needed. This has been one reason dealers have been showing keen interest in convertible equipment that could be used for either oil or gas firing.

This interest has been further increased by violent fluctuations in the availability and comparative prices of various kinds of fuel, promises of additional natural gas for home heating, widespread building activity, and the need for additional sales features to help offset customer resistance to the present high cost of new homes.

Heating dealers have an outstanding opportunity to sell more automatic heating equipment for new home construction, provided they have equipment that can be easily and economically converted to oil or gas heating as conditions demand. To the person building to occupy, the dealer can point out that the installation of a convertible furnace would add only about \$1 or \$2 to the monthly financing payment as compared to a hand-fired furnace.

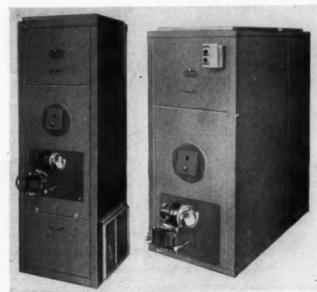
The choice of heating fuels is somewhat a personal matter. Even though a person builds to occupy, circumstances may require that he later sell. He will find in such a case that it is far easier to sell his home if the heating unit can be fired either by oil or gas by simple convertibility.

To the contractor building to sell, the dealer can show him how he has an added outstanding feature to help him sell the house. By emphasizing how he has provided for the future as well as the present convenience of the prospective buyer, through the installation of a convertible furnace, he will build confidence in his entire home construction dealings.

The home owner with a convertible furnace has greater freedom from price squeeze on fuel. If the type of fuel he uses should get out of hand either pricewise or as to supply, he can easily change to oil or gas as the occasion demands.

Heating dealers, to keep sales volume up, must be prepared to exploit the new home market with convertible automatic heating equipment which has the versatility that will appeal to those building to occupy, as well as to those who are building to sell. This equipment must be attractive from a price standpoint; it must be compact in size for installation in small basements, first-floor utility rooms and kitchens; it must be soundly engineered to provide completely automatic heat with full economy and maximum safety; and it must operate quietly.

Convertible heating equipment that meets all these requirements . . . and more . . . is now available from Century Engineering Corporation, Cedar Rapids, Iowa. The new line has been appropriately named the "Century Convertible" and is available in both hiboy and loboy styles, with interchangeable oil and gas burners. The sizes permit dealers to sell equipment for both small and medium size homes, where the big sales volume will be found. For illustrated literature and complete details of the new Century Convertible lines, write today to Century Engineering Corporation, Cedar Rapids, Iowa.



—Censury Engineering Corporation Photos.

New Convertible furnaces shown with oil burners
....interchangeable gas burner fits same furnaces.

NEW Revolutionary

FUEL BURNER—Same Head Burns
Both Oil and Gas

NOT TWO BURNERS—BUT ONE

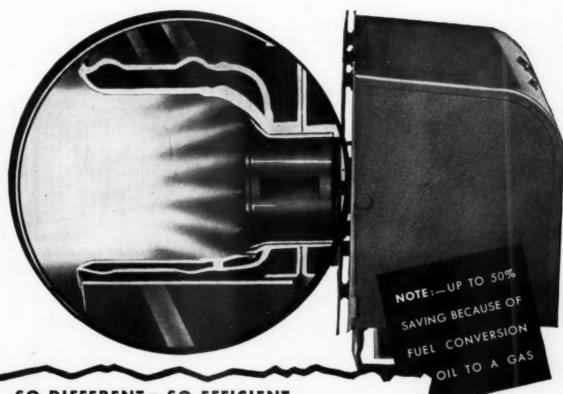
A low-cast, dual fuel burner for every
type of domestic heating plant.

NO

Here's a completely new, revolutionary idea in oil and gas heat...

- Conventional nozzles
- High voltage transformers and electrodes
- High pressure pumps
- Oil-air mixing vanes
- Large capacity fans
- Large horse-power motors to drive fan and pump
- Expensive stack controls

Gives dealers with the ability to aggressively merchandise a new idea—an opportunity to double sales potentials—avoid price competition—offer a better value in heat to the customer. A sound, profit-building advertising sales program will be provided—write today.______



SO DIFFERENT - SO EFFICIENT

Converts Oil to a Gas

THROUGH SAME BURNER HEAD BURNS
BOTH DOMESTIC OIL and GAS of any type

THE NEW, REVOLUTIONARY

Etronic

Exclusive Advantages—The ability of the Jetronic Fuel Burner to burn oil as gas is revolutionary. And it is all accomplished prior to ignition. The fuel oil is completely converted into a gaseous mixture in a special design pre-heated chamber. The hot gas is then mixed with the right amount of air with microaccuracy by the Jetronic Air Turbulator and automatically ignites. The gas burns with an entirely smokeless, crystal-white, 2400°, super-hot flame . . . all carbon, sulphur and ferrous oxides found in fuel oil are completely consumed. It's pure—a new kind of heat, 700 degrees hotter than conventional type burners, and completely free of smoke, soot and odor.

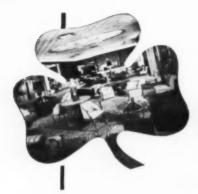
Instant Conversion from Oil to Gas—is accomplished automatically by a trouble-free switch. Because Jetronic burns oil like gas, it burns gas too, without any change whatever. The Jetronic Fuel Burner makes the user-secure—two fuels—one burner for both. And . . .

IT CAN BE INSTALLED IN ANY TYPE OF HOME HEATING PLANT!

 \Box

WRITE for complete information, literature and dealership franchise

Manufactured by Consolidated Industries, Inc. Lafayette, Indiana Jetronic



4 types of AAF filters serve The Shamrock



Construction Manager: STONE & WEBSTER ENG. CORP. Architects-Engineers: WYATT C. HEDRICK Air Conditioning Contractors: ASSOCIATED MECHANICAL CONTRACTORS

New Houston, Texas luxury hotel features filtered air for guest comfort and economy of operation.

EVERY guest room as well as lobby, restaurants, shops and service quarters are air conditioned at The Shamrock. It takes 30 separate air conditioning systems to do the job and 4 different types of AAF Filters to provide the varying degrees of air cleaning required.

AAF is the only single manufacturer who could have supplied this range of filter equipment. The reason—it is the

only company producing a complete line. Filters on this job range from the simple viscous unit type to the high efficiency, self-cleaning electronic precipitator. The air conditioning engineers analyzed the needs of each individual system—then specified the filter to meet the specific requirement.

Filtered air, free of dust, dirt and smoke, is a sound investment for every business. But your needs can vary from a similar business in another locality or a different business right next door. AAF's complete line of product plus 25 years' successful engineering experience assures an impartial and sound solution to your air cleaning problems.

For complete product and application data, call your nearby AAF representative or write direct to:

AMERICAN AIR FILTER COMPANY, INC.

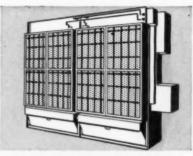
355 Central Avenue, Louisville 8, Ky. In Canada: Darling Bros., Ltd., Montreal, P. Q.

MI

AIR FILTERS

AND ELECTRONIC PRECIPITATORS

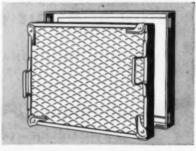
THESE AAF PRODUCTS SERVE THE SHAMROCK'S AIR CLEANING NEEDS



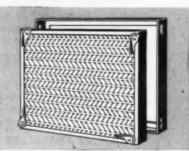
ELECTRO-MATIC high efficiency automatic electronic precipitators provide super-clean air for the air conditioning systems that serve the hundreds of guest rooms.



MULTI-DUTY automatic viscous filters clean the air for those air conditioning systems which supply the lobby, dining rooms, and all public rooms below the third floor.



M/W UNIT filters provide clean air for the laundry and other work areas.

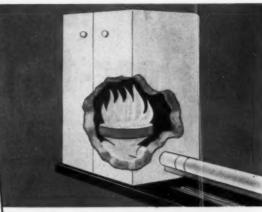


A/C UNIT filters are used in the garage adjoining the hotel.

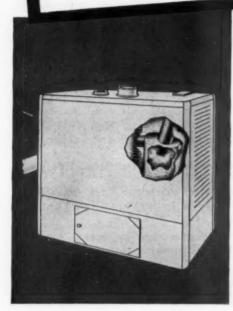
This is a typical example of "Selective Air Filtration" — the right filter for every job.

3 ways your customers can save up to 52% on annual fuel bills

...with modern automatic Anthracite heat



Automatic Anthracite Stokers -Installed in an existing boiler or furnace; or in new houses, automatic hard coal stokers deliver plenty of heat quickly ... save up to 52% on fuel bills ... eliminate fuel worries.



The Revolutionary Anthratube-The Anthratube saves on fuel bills . . . its proved efficiency is over 80%. This scientifically engineered boiler-burner unit, with "Whirling Heat" and other revolutionary features, produces quicker response and superior performance than units using other types of fuel. Fully automatic.

Anthra-Flo boller-burner unit-An entirely new type boiler-burner which features a simple burner mechanism, attached by two bolts with all working parts outside boiler. Fully automatic, coal feeds direct from bin across single stationary perforated plate . . . ashes discharge by gravity into container within unit.



TODAY YOU CAN OFFER YOUR CUSTOMERS modern automatic heat with Anthracite equipment.

You can show your customers how to save money . . . as much as \$100 to \$200 every year and yet have plenty of heat-clean

heat-even heat-and no worry about future supplies or deliveries.

For complete information about (1) New Anthracite Stokers (2) Revolutionary Anthratube or (3) Anthra-Flo boiler-burner unit, just fill in and return the coupon below.



ANTHRACITE INSTITUTE

101 Park Avenue • New York 17, New York

ANTHRACITE INSTITUTE 101 Park Ave., Dept. 8R, New York 17, N. Y.

- Please send me more information on
 - 1. New Anthracite Stokers 2. Revolutionary Anthratube
 - 3. Anthra-Flo boiler-burner unit

Address. City. State. PLEASE PRINT

NOW IS THE TIME TO SELL Floor-to-Ceiling-Comfort!



Every Gravity Furnace—Coal, Gas or Oil—Delivers EVEN WARMTH When REX AIR-PAK is Added!



AIR-PAK

Blower-Filter

It's too late when the snow drifts up around your customer's door! That's why he'll be glad you told him these big advantages of Rex Air-Pak this month.

- No more drafts or cold spots. Rex Air-Pak furnishes even warmth . . . floor-to-ceiling comfort!
- Solves hard-to-heat room troubles. Every room is comfortable.

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- Home stays clean! Airborne dust, disease germs and hay fever pollens are filtered out.
- Cuts fuel bills as much as 30%.

You can show your prospects by actual figures that Rex Air-Pak will soon pay for itself!

MAKE BIGGER PROFITS WITH REX LOW-COST INSTALLATIONS

Rear view of Rex Air-Pak with door removed

EASY TO INSTALL—Casings are supplied assembled but can be knocked-down where openings are too narrow.

QUIET OPERATION—Blower has large air capacity to assure quietness even where long piping resistance must be overcome. Blower is rubberinsulated from casing. Motors resilient mounted.

SELF-ALIGNING BEARINGS—Trouble-free service is assured by self-

SELF-ALIGNING BEARINGS—Trouble-free service is assured by selfaligning bearings of porous bronze—correct amount of oil is fed to friction surface.

OIL EVERY TWO YEARS—Sight-feed oil gauge and bearing holds 4 times as much oil as conventional bearing. Requires oiling no oftener than once every two years.

WIDE RANGE OF SIZES—Delivery ratings from 40,000 to 400,000 B.T.U. per hour meet the requirements of any job.

Write for catalog No. 253 today.

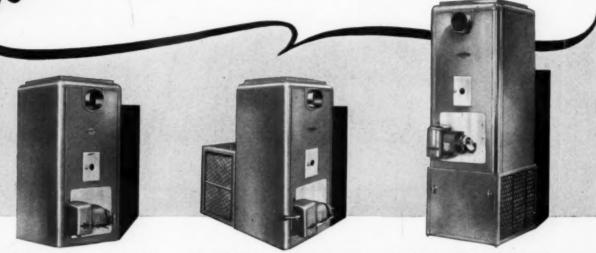




THE CLEVELAND HEATER COMPANY 2310 Superior Avenue, Cleveland 14, Ohio



Gell the Small Home and Builder Market with these NEW LOW-COST DELCO



New Delco-Heat oil-fired gravity warm air furnace with a new and dependable vaporizing-type, forced-draft burner. A wonderful value! Now even the smallest homes can have all of the advantages of top quality automatic Delco-Heat
-at low cost!

New Delco-Heat oil-fired forced warm air furnace—with (1) vaporizing-type forced-draft burner, or (2) Delco-Heat pressure atomizing burner with the exclusive "Rotopower" unit. For lowceilinged basements and installations where head room is restricted!

Another new Delco-Heat oil-fired forced warm air furnace compactly designed for utility room and basement installations—or where floor space is limited. Available with (1) vaporizing-type, forced-draft burner—or (2) the famous Delco-Heat pressure atomizing burner!

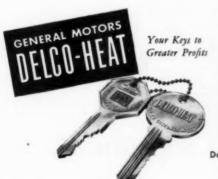
Here are five brand new Delco-Heat oil-fired Conditionairs -especially engineered to meet the requirements of small home owners and builders! Five new Conditionairs-in both gravity and forced warm air models-with either vaporizing forced-draft or pressure atomizing-type burners! They're easy to install, easy to service—and because all models have the same "basic unit" construction, they're economical for you to stock!

Most important-these new Delco-Heat Conditionairs, with their many outstanding features, will give your value conscious customers exactly what they want in automatic home heating . . . dependability, comfort, convenience

These new Conditionair models are perfect companions to the other great Delco-Heat products-conversion Oil Burners, oil-fired Conditionairs, gas-fired Conditionairs, oil-fired Boilers, automatic Coal Stokers, and oil and gasfired Water Heaters. Now the Delco-Heat line is more complete, more valuable than ever. Now, when you sell Delco-Heat—a real General Motors' value—greater profits can be yours, because:

- 1. You'll be selling a name that's a household word-a name synonymous with value.
- 2. You'll have a complete line of oil, gas and coal-fired home heating units.
- 3. You'll be backed by research and engineering that will keep the products you sell out in front.
- 4. You'll have the help of an advertising and sales promotion program that really works!

For full information about the advantages of a Delco-Heat franchise, write to Delco Appliance Division, Dept. AA-8, General Motors Corporation, Rochester 1, N. Y.







Delco-Heat Conversion Oil Burner



Delco-Heat Oil-fired Boiler

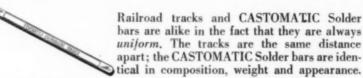


Delco-Heat Automatic Stoker

Manufacturers of Delco Water Systems for farms and homes —Fractional Horsepower Electric Motors — Electric Automobile Clocks



They MUST be uniform!!!



And uniform solder bars mean quicker, easier, smoother soldering for YOU!

CASTOMATIC is the most notable development in the bar solder field since tin met lead. Exclusive with Federated, it is a process by which patented machines automatically cast bars with a precision that hand casting cannot equal. From melting pot to mold, the molten metal is carried under pressure in a closed system, thereby completely excluding harmful oxides.

There are no voids in CASTOMATIC bars . . . no segregation to slow down the job. Every portion of every bar melts at the same temperature, because the electronically controlled machines guarantee identical composition throughout. CASTO-MATIC surfaces shine all over and tell of uniform quality beneath.

Available in standard 11/2 lb. bars; all commercial compositions. Ask for CASTOMATIC Solders!



AMERICAN SMELTING AND REFINING COMPANY, 120 BROADWAY, NEW YORK 5, N.Y.

Ам



No other furnace line gives you so much <u>value</u> to sell



and...

Superfex fits all specifications . . .

You have choice of the "Homogen-Air" system, two-stage system or gravity; Choice of gas or oil furnaces; Choice of vaporizing or gun-type oil burners; Choice of natural, manufactured or L.P. gas burners; Choice of basement furnaces, high-boy furnaces, floor furnaces or overhead units.

Superfex saves installation costs...

All but two largest models come as "package" units, completely assembled and ready for quick tie-in to ducts, power and fuel.

● Superfex "Homogen-Air" is the ONLY system with a continuous three-stage fire, synchronized with automatic two-speed blower. Superfex is, in effect, TWO furnaces in ONE... FIRST, the high fire, synchronized with full-volume blower speed, makes it a POWERFUL COLD WEATHER FURNACE; SECOND, it automatically cuts back to either of two stages of low fire, and low blower, operating as an ECONOMICAL MILD WEATHER FURNACE.

By fitting its fire to the need, SUPERFEX SAVES MONEY. Makes a hit with customers who are demanding MORE FOR THEIR DOLLARS.

Perfection Stove Company • 7095-D Platt Ave. • Cleveland 4, Ohio

Superfex of OIL FURNACES

Write for the complete "Homogen-Air" story and let us show you how to build a profitable heating business on customer satisfaction with Superfex.

you want — you need

A FURNACE CEMENT that's TOUGH and SURE

THAT CAN TAKE IT ... AND CONTINUE TO TAKE IT!



The unusual strength of this cement is proven by this unretouched photograph—showing a re-set furnace completely suspended in mid-air. The entire and off-center weight carried through the Grant Wilson Furnace Cemented Section joints.

A PRODUCT OF

GRANT WILSON, INC.

22nd Floor, Board of Trade Building Jackson Blvd. at La Salle St. Chicago 4, Illinois

... in other words GRANT WILSON ASBESTOS FURNACE CEMENT

The Furnace job that "stands up" is the greatest of all Confidence Builders. Because a furnace is only as tight as its cemented joints, *Grant Wilson Asbestos Furnace Cement* continues to increase in popularity in the trade on the basis of actual performance.

It won't crack or crumble, it stays put and takes a lot of punishment! And, because Grant Wilson Asbestos Furnace Cement is scientifically compounded it's uniformly and dependably good.

Furthermore, this high-heat resistant cement is easier to handle . . . works in smoothly . . . forms lasting sections.

Leading jobbers from coast to coast stock Grant Wilson Asbestos Furnace Cement. Insist on getting it now—and prove its superiority for yourself.





The New PEERLESS

Thermejector

Golden Anniversary Steel Furnaces

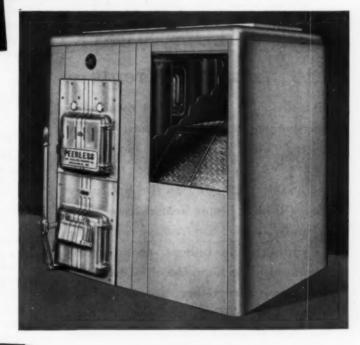
For Coal, Oil or Gas

New Radiator Efficiency

• Here's the "money-making-est" line of furnaces PEERLESS has ever offered to the trade—a line that "has everything" to meet your customers' needs, and to make selling the easiest thing you do.

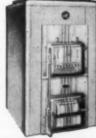
Pictured at right is the new square cased Peerless "Thermejector" forced air steel furnace with the new 3-way radiator and built-in damper that starts fires in a jiffy without smoking or "puffing", and extracts maximum heat from the fuel. It's the neatest looking, and the most efficient unit in this year's offerings. Other furnaces in the line, all incorporating the same super-efficient "Thermejector" principle, are pictured below.

This is our fiftieth year, our golden anniversary—and we are celebrating, with the greatest values we've ever offered. Write today for new literature describing all of these fast-selling furnaces—and "get set" for your biggest new furnace year—with Peerless!





PEERLESS famous round-case unit with V-baffle radiator. Always a favorite. Efficient. Economical.



PEERLESS squarecase gravity furnace. Its beauty and efficiency will make sales come easier.



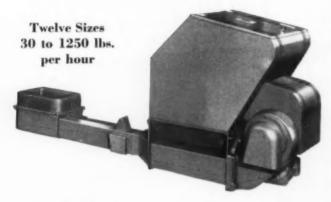
PEERLESS squarecase furnace with the fuel-saving 3way baffle radiator. Sells the man that's "hard to sell."

PEERLESS FOUNDRY COMPANY

PIONEERS IN WARM AIR HEATING FOR HALF A CENTURY

INDIANAPOLIS 7, INDIANA

IDEA TO BOOST SALES NOW!



Sell larger sizes of ECON-O-COL STOKERS

to help boost rents

Give this idea a whirl! Let owners of apartments, stores, garages, green-houses, etc. know they can profit TWO WAYS by installing ECON-O-COL STOKERS now. In the first place they will have better heat at lower cost. Secondly, since the stoker represents a building improvement, rents can be increased. Use Econ-O-Col ad mats for newspaper advertising, Econ-O-Col circulars for mailing to selected lists. You lift yourself out of competition with small household units and make more money on each sale. Interested? Write or phone us today for details!



NEW LITERATURE

Use Coupon on Page 117

Air Meter Bulletin......282

Bulletin 25-A, a four page folder, explains operation and applications of a new air meter. It shows how the instrument is used to measure air velocity from 10 fpm to 6,000 fpm, in increments as small as $2\frac{1}{2}$ fpm. Also explained is application to temperature measurements ranging from 30 to 155 F, within accuracy limits of $\frac{1}{2}$ of a degree.

The folder also covers static pressure work in which the values are read directly in terms of inches of water. Range is from 0 to 4 negative and 0 to 10 positive. Construction of the meter and operating principles are also described.

Anemostat Corporation of America, 10 E. 39th St., New York, N. Y.

Furnace Catalog283

Three types of gas floor furnaces and a dual wall furnace are described and illustrated in a 15-page catalog. Important features of the units are explained and cutaway diagrams are included to illustrate the construction advantages of the furnaces. Complete specification tables are given for each model.

Gas burner, shut-off valve, u-type gas control valve, and modulating thermostat are treated separately, with advantages of each described in detail.

The Coleman Co., Wichita 1, Kansas.

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Booklet entitled "10 Ways to Heat Your Home" is designed to help home planners select the heating system most suitable for the type of dwelling they plan to build. It discusses all types of fuels, including solar energy, and all types of heating systems in popular use. Written in non-technical language and illustrated with simple diagrams, the 24 page guide includes tips to help home builders discuss heating plans with architects, contractors, and heating dealers. It also describes the various types of control systems available, including a newly developed electronic control, and specialized controls for use with radiant panel heating.

Another section of the booklet is devoted to discussion and illustrations of warm air registers to aid in selection of heating outlets which best conform to the builder's interior decoration plans.

Minneapolis-Honeywell Regulator Co., 2753 Fourth Ave., Minneapolis 8, Minn.

Power Ventilator Data......285

Seven different applications for AirXpeler power ventilators are listed in literature describing these positive powered ventilators. Complete construction details and design features are given and an air capacity table is included for handy reference.

C. L. Ammerman Co., Metropolitan Life Bldg., Minneapolis 1, Minn.

"Why doesn't our company do like other companies?"



If you haven't yet installed a Payroll Savings Plan in your company, you can be pretty sure some of your employees are asking that question. For workers like this easy, automatic way of investing in U. S. Savings Bonds—and more than 20,000 large companies have made this convenience available to the people on their payrolls.

WHAT GOOD IS "PAYROLL SAVINGS"?

The Payroll Savings Plan is the *only* means by which people can obtain Bonds automatically on the installment plan. It pays off in many ways: increased security for the individual, who gets back \$4 for every \$3 when the Bonds mature; company benefits due to improved worker morale—a reduction of absenteeism, labor turnover, and accidents; increased national security, because Bond sales spread the national debt.

HOW MANY CAN AFFORD BONDS?

Deductions for taxes and other purposes which reduce take-home pay should not be confused with allotments for Bonds, which are taken home as *interest-paying savings*. Of course, the cost of living makes it tough for some people to buy Bonds. But nation-wide experience indicates that 40-60% of the employees in any company can be persuaded to sign up for Payroll Savings—without high-pressure selling.

7,500,000 workers are regularly buying an individual average of \$20 of Savings Bonds per month. Show your employees that you want them to have the convenience of Payroll Savings. You'll find it easy to set up the Plan in your company. All the materials and assistance you need are available from your State Director, U. S. Treasury Dept., Savings Bonds Division. (See your phone book.) Why not talk it over with him now?

The Treasury Department acknowledges with appreciation the publication of this message by

AMERICAN ARTISAN



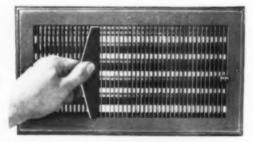
This is an official U.S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.



BEFORE THE FALL RUSH

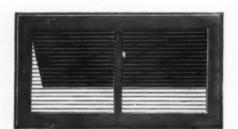
You'll be All Set to meet the Fall Installation RUSH by having quality U. S. registers on hand. Smartly-styled U. S. registers cost less to install, giving you a greater profit margin.

No. 256



4-WAY FLOW A-C REGISTERS

You get Beauty, Efficiency, and Complete Versatility when you select No. 256 for your Air-Conditioning jobs. Your stackhead air-flow can come from any direction—there is nothing to obstruct the air-flow. And the combination of multiple valves and adjustable grille-bars gives you any directional air-flow needed for best heating results.



No. 153

AIR CONDITIONING REGISTERS

Where price must be kept down but customers demand a good-looking job, too, install these single valve type registers. Grille bars are adjustable and hide register interior. Guaranteed by us to you to be The Best Constructed Single Valve Register in the Industry. A comparison with "others" will back up this claim. Not a Mere Stamping—but—A REAL Product.

Send for your copy of the new U.S. Handy Pocket catalog No. 50

UNITED STATES REGISTER CO.

MINNEAPOLIS . KANSAS CITY . ALBANY

NEW LITERATURE

Use Coupon on Page 117

Data sheet and application bulletin is announced on Heat-Rem, high heat resisting aluminum paint. The paint is suitable for use on all interior or exterior hot surfaces subject to 1,000 to 1,500 F. May be applied by either brush or spray, sets in 4 hours and dries in 24 to hard, brilliant finish. Resistant to fumes, moisture, and acids. Average coverage is said to be 600 sq ft per gal.

Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio.

Gas Conversion Burners......287

Gas conversion burners for domestic and larger industrial installations are fully described in a catalog which includes illustrations of all models. Also explained is the Air Lock principle, which the literature claims is a feature exclusive with these burners. The principle is based on secondary air being drawn through the center of the burner to force the flame outward in a sunflower shape against the combustion wall. This prevents cold air from getting between the flame and the wall to serve as an undesirable insulating agent.

Domestic burners discussed are Models 8CD and 8. Model 5 is designed for large installations, and the 700 Series of industrial burners are described as tailormade for industrial boilers. There is also a Model 2 burner for restaurant ranges.

Reinhard Brothers Co., Minneapolis 2, Minn.

An informative booklet on heliarc welding lists the advantages of the process, the metals which can be welded by this method, and the equipment required.

Right source of power and right type of current is discussed, and a table of recommended electrodes and cup sizes is given.

In a section called Heliarc Welding Data, instructions for making various kinds of joints are accompanied by illustrations of the work in process. Methods for welding aluminum, magnesium, and stainless steel by heliarc process are also covered in the section. The last page is devoted to list of part numbers and description of equipment for convenience of customers in ordering.

The Linde Air Products Co., New York, N. Y.

Window Fan Literature......289

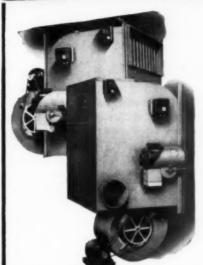
Catalog sheet is available on the Chill Air window fan equipped with special offset blades. Fan sizes are 16 and 20 in., operating at three motor speeds. Easy installation feature recommends these fans for offices, apartments, and homes. Adjustable fill-in mounting panels are available to fit any size window.

National Engineering & Manufacturing Co., Kansas City, Mo.



DOMESTIC AND INDUSTRIAL HEATING **UNITS**

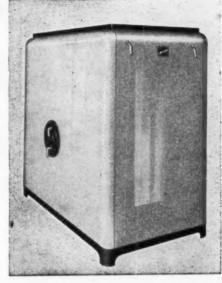
EASIER SALES AND MORE SATISFIED **CUSTOMERS**



The variety of models to suit practically every heating purpose makes QUICK HEAT a recognized profit builder for warm air heating dealers. Practical ap-plication of sound engineering prin-ciples combined with extensive experience has produced this highly recognized line of superior equipment. Performance and convenience of these units proves business building quality to dealers handling this line.

Overhead Units For Ceiling or Wall Mounts

Dealers: WRITE FOR DESCRIPTIVE LITERATURE



READY FOR INSTALLATION

Floor units are mounted on legs to prevent rusting of bottoms and elimi-nate air leaks. Factory assembled in attractive casing with new type heat saver and specially designed gun type oil burner. Convenient and quick installation.

TJERNLUND MFG. CO 2140 Kasota Ave. St. Paul 8, Minn.

The Heart of the

*Brundage BLOWER

*the NEW Brundage Wheel!

for performance, for quality, for strength of material, for method of construction, be sure it's a Brundage

WRITE FOR INFORMATION



Conventional Furnace Adaptation





Evaporative



Blower Specialists Since 1919 6 12 NORTH PARK STREET KALAMAZOO 11, MICHIGAN





OW you can get flashing that bonds the masonry both laterally and vertically in every direction-and is promptly available at a moderate price!

Chase Thru-Wall Copper Flashing incorpo rates a unique saw-tooth design that produces a 3-way bond-and provides channels for rapid drainage of any moisture penetrating the wall.

Chase Thru-Wall Copper Flashing comes in 6-foot lengths, with interlocking overlap that ends the need for soldering-is easily formed by the sheet metal contractor.

Available through 23 Chase warehouses-and through leading distributors.

the Nation's Headquarters for

BRASS & COPPER

WATERBURY 20, CONNECTICUT SUBSIDIARY OF KENNECOTT COPPER CORPORATION





Mail coupon for free information on features and uses.

			G	Copper	Co.	
			Waterbury		20,	Conn.
	C					

Please send me free descriptive literature on Chase Thru-Wall Copper Flashing.

NAME

ADDRESS_

STATE_

NEW LITERATURE

Use Coupon on Page 117

The many thermal and acoustical uses of Aerocor, a blanket-like material made of superfine glass fibers, are described in an eight-page booklet. Information given includes physical properties, product specifications, and typical applications in heating systems, air conditioners, and duct insulation.

Owens-Corning Fiberglas Corp., Toledo, Ohio.

Bulletin on a compact spot welder lists important construction features of the unit, and includes a section on operating instructions. The welder is designed for 220 volts, 60 cycles, 60 amps, one phase, ac. Capacity, 4 kva. Equipped with heat control switch with five taps. Voltages and frequencies other than standard can be furnished at a slight additional cost.

Birdsell Manufacturing Co., Inc., Los Altos, Calif.

Complete line of ventilating equipment is covered in an extensive new catalog. Featured in conjunction with rotary turbine ventilators is the new curb mounted fan which allows fan diameter to be as large as throat diameters. With this design, the specified cfm can be delivered by a smaller and more economical installation.

Western Eng. & Mfg. Co., Los Angeles 21, Calif.

New set of literature on Janitrol winter air conditioners consists of special two-color pieces, graphically illustrated with charts, cutaways, and photographs. It is designed for Janitrol dealers, as well as architects, builders, and consumers who are interested in this line of equipment. Included in the literature are a 10-page product folder and two 22 x 30 in, broadsides outlining the salient features of the line.

Janitrol Div., Surface Combustion Corp., Toledo,

Rust-Inhibitive Paint

Literature on Totrust, a paint primer and finish coat which is rust-inhibitive, announces a major improvement of deeper penetration, higher gloss, and tougher weathering qualities. Totrust is designed to get into rusted pits and inhibit rust at its source to control further corrosion. The paint also is said to save time and labor on the job because it is applied over damp surfaces and squeezes moisture to the surface through its capillary action. Coverage, 800-1,000 sq ft per gal. Available in range of colors, and in aluminum finish, called Totalume.

The Wilbur & Williams Co., Boston 15, Mass.







8" SCALE—Widest Scale of Any Mechanical Air Velocity Meter Ever Designed!

The FloRite is an unsurpassed sales and service aid in heating, ventilating and air conditioning work. On installation and service work it is used to determine velocity and direction of air flow from registers and grilles for the purpose of checking rate of air delivery, balancing the system and adjusting deflecting vanes and louvers of registers so as to obtain "draft free" air distribution. These tests cut installation and service time, prevent expensive call-backs, and promote customer goodwill. The FloRite is equally helpful for selling new equipment or modernization. It can be used in many ways to convincingly demonstrate discomforts and inefficiencies of a worn-out or inadequate system.

The FloRite is entirely self-contained. It has no hose or probe,

and gives all readings required for heating, ventilating and air conditioning work. The detachable handle facilitates use of the FloRite at low wall or high side wall registers. By screwing a $\frac{1}{2}$ 4" pipe into the handle the FloRite can be conveniently held against ceiling grille.

The FloRite is equipped with a unique scale lock which makes it possible to retain the reading until the lock is released. For ceiling grille readings, this lock is easily manipulated by means of a piece of string. This feature makes the FloRite exceptionally adaptable for indicating air velocity in hard-to-reach or dimly lit locations.

COMPLETE, in leather case.....\$32.00



Ask your jobber for the FloRite or write for Leaflet 760.

BACHARACH INDUSTRIAL INSTRUMENT CO. - 7000 Bennett Street · Pittsburgh 8, Pg.

Sell Better Heat at Less Cost . . . SELL HERCO the Profit-Conscious Oil Heat Unit

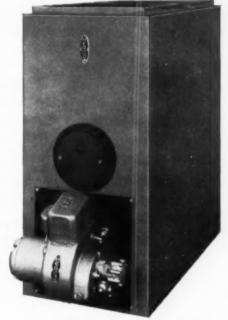
Your customers are going to buy the heating unit that will give them lasting performance at the lowest possible cost. Naturally, then, they'll be interested in the new Herco... the year's Number One value in warm air heat units. Not only does the Herco Unit cost less... it is top quality throughout. Its combustion chamber has a double wall of durable stainless steel for dependable heat delivery. The special Economizer saves fuel, because it captures "lost" heat and utilizes it to pre-heat cold, incoming air. If you're wise, you'll sell your customers Herco—for only Herco

Famous HERCO burner . . . heart of every unit!

Oil-thrifty Herco burners produce a clean, efficient flame that leaves no unburned gases to be converted into soot and fumes. The compact Herco burner is easily described from the unit and is readily ac-

tached from the unit and is readily accessible for any servicing. An exclusive Hereo feature, the Thrifti-fier, mixes just the right amount of air with the oil so that every drop is converted into actual heat.

can give them so much heat . . . from so little oil . . . for so little money. Write for literature.



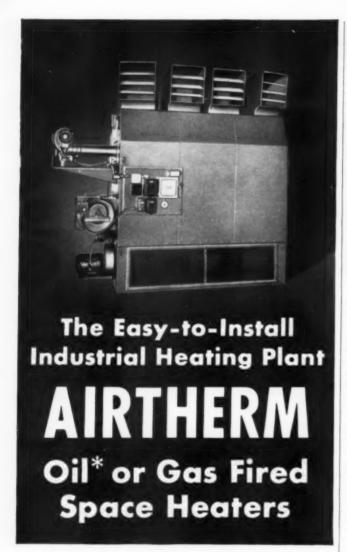
• Herco Low Boy HLB 65- 65,000 BTU HLB 85- 85,000 BTU Also available in High Boy Models . . . 65,000 and 85,000 BTUs

HERCO STAINLESS STEEL OIL HEAT UNIT

"Built to Last a Lifetime"

Manufactured by Herco Oil Burner Corporation •

Lancaster, Pennsylvania



Airtherm space heaters are easy to install. They are furnished complete with all operating and safety controls for automatic operation. Airtherm space heaters have a steel combustion chamber lined with castable refractory for simple maintenance and long life.

Available in nine models ranging from 650,000 to 1,950,000 BTU per hour output in floor mounted or suspended types.

For detailed information write for Catalog 802

"Approved by Underwriters' Laboratories

AIRTHERM MANUFACTURING COMPANY

706 South Spring Ave.

St. Louis 10, Mo.

NEW LITERATURE

Use Coupon on Page 117

Application of propeller fans for solving ventilation problems in industrial, commercial, and institutional buildings is described in a 12-page booklet entitled "1001 Ventilating Problems Solved." Results of this form of ventilation are discussed, and features of the manufacturer's six basic models are presented.

The balance of the booklet illustrates photographically installations in operation in factories, plants, and stores, as well as institutions.

The Herman Nelson Corp., Moline, Ill.

New four-page circular describing all models in Thor Silver Line of portable electric tools is now available. Tools illustrated and described include impact wrench, electric drills, grinders, polishers and sanders, and portable electric saws.

Independent Pneumatic Tool Co., Aurora, Ill.

Catalog page lists dimensions and ratings on a line of Mighty Midget oil units, designed for small homes. These units, available in four sizes, are complete and compact, providing heating, circulation, humidification, and air cleaning for any residential installation.

bu

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370

Dowagiac Steel Furnace Co., Dowagiac, Mich.

Specification sheet is available on a compressed wood mallet, made from hard maple or ash treated and compressed from an original diameter of 2-15/16 in. to 2% in. It is said to be the ideal tool for non-denting pounding. Size, weight, and price data are included. Kimco, Delafield, Wis.

Automatic Furnace Catalog 299

Complete new catalog of diversified line of automatic furnaces and boilers is available. This illustrated booklet includes both oil and gas fired units, as well as gas conversion kits to enable the oil burners to be changed over to gas, if desired, in areas where natural gas may become available at a later date.

The Heil Co., Milwaukee 1, Wis.

Six new electrode holders for the inert arc process, one for machine welding and five for manual welding, are announced in Bulletin GEA-5146. Manual holders are available in 100, 200, 400, and 800 amp ratings; the holder for machine welding, in ratings of 400 and 800 amps.

General Electric Co., Schenectady 5, N. Y.

For Gas Conversion BARBER BURNERS

Are consistently preferred by Those Who Know!



Why do so many heating experts, year after year, pick Barber Conversion Burners for their customers? Because, in service, Barber really delivers the goods! Barber has never sold on fancy frills or dolled-up design. It's what goes on inside the furnace that interests Barber and interests its users. The Barber impinged jet, the vacuum pre-mixture principle, and the direct scrubbing flame application to heating surfaces — these funda-mental Barber concepts are still unequaled in conversion burner design.

Barber has adopted every detail of advanced enginearing, when proved in service, and not before. Barber has been conservative, but also safe and sound, and thereby kept the approval of gas authorities and foremost utilities. We value this approval. We pledge our best efforts to keep Barber at the TOP among conversion burners. For ease of installation, TOP performance, and actual heating efficiency - BARBER is the grand-daddy of them all!

Barber is the pioneer specialist in the development of every type of burner unit for all gas appliances, and offers its

engineering facilities for your use. Ask for complete Catalog showing all Barber products.

THE BARBER GAS BURNER CO.

3704 Superior Avenue

Cleveland 14, Ohio







PROVIDES COMPLETE WINTER and SUMMER AIR TREATMENT MAINTAINS A CLEAN HOME . . . PROTECTS FURNISHINGS GUARDS AGAINST THE COMMON COLD

MEANS EASIER BREATHING . . . REMOVES POLLEN SUPPLIES ADEQUATE, TROUBLE-FREE HUMIDIFICATION

"Makes A Fine Day Every Day"

Scientifically correct combination of Chemistry and Electronics in one compact unit, automatically humidifies, cleans and purifies the air. The Brundage AIR-RENEWER can be installed with any type heating system (Warm Air, Steam, Hotwater, Radiant). It can also be used with any type cooling system. DON'T WAIT . . . Your Health and Home Demand it! See or Call -





DEALER NAME HERE

(Reduced from Actual Mat Size)

A MESSAGE TO OUR CUSTOMERS:

Ask for this newspaper ad which has been prepared for you. Use it in your newspapers to tell your customers about this new product which means home and health protection for them.

"Make Every Day a Sales Day"

Information available to others interested in this product



Blower Specialists Since 1919 612 NORTH PARK STREET KALAMAZOO 11, MICHIGAN

News Summary-

(From page 80)

Brundage Awarded Degree

HENRY M. BRUNDAGE, JR., manager of the automatic heating division of General Electric Company's air conditioning department, Bloomfield, New Jersey, was



Henry M. Brundage, Jr., right, General Electric Company, receives honorary degree from Dr. Harvey N. Davis, president of Stevens Institute of Technology.

awarded an honorary degree in Mechanical Engineering by the Stevens Institute of Technology at the commencement exercises held in Hoboken, N. J., during the month of June. The degree was conferred by Dr. Harvey N. Davis, president of the Institute, in recognition of Mr. Brundage's contribution in the field of public service.

Mr. Brundage attended Stevens in 1918, leaving to join the army where he served as an officer in the coast artillery, and returned to Stevens after World War I.

Steel Production Declines During June

STEEL PRODUCTION DECLINED in June for the third consecutive month and fell to the lowest point in more than one year, according to the American Iron and Steel Institute.

The 6,501,332 tons of ingots and steel for castings made in June was a drop of more than 1,000,000 tons from the amount of raw steel made in May, and a decline of nearly 1,900,000 tons from the record production of March.

Steelmaking furnaces were operated in June at an average of 82.2 per cent of capacity. That was the lowest monthly rate since April 1948. It was 10.7 points lower than the May average and 20.5 points lower than in March. For 10 consecutive months prior to June, operations had averaged above 90 per cent of capacity.

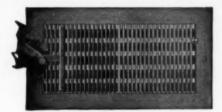
Because of the record high production in the early part of this year, the total output of raw steel in the first six months of 1949 established a first-half record at 45.928,476 tons. That was more than 2,800,000 tons

TRIANGLE PILLOW BLOCK

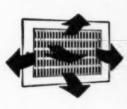


TRIANGLE MANUFACTURING COMPANY

9ndependent WROUGHT STEEL REGISTERS PROVIDE WAY ADJUSTABLE AIR FLOW



Design No. 238





Right...left...up:::down:..air flow at any angle desired, in addition to straight outward... plus the durable construction which has distinguished Independent products for more than 46 years...

238 Independent Wall Register. Vertical grille bars are manufactured at an angle of 30 degrees, one-half to the right and one-half to the left. They may be bent to direct air flow at any other right or left angle or straight outward. Horizontal multiple valves located at

the back of register can be set to deflect air flow up, down, or straight outward. Available in standard sizes 8"x6" to 30"x8".



Send for New Catalog No. 48

Always Leading—Always Progressing

THE INDEPENDENT REGISTER CO.

3747 E. 93rd STREET . CLEVELAND, OHIO

NOW ...

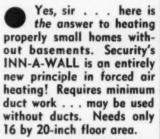
a TRULY Forced Air

empl where

75.000

Input

. . . and you can employ duct work where necessary!



The INN-A-WALL reverses the usual flow pattern . . . warm air comes out the bottom. This means warm floors! Warm air can be taken from all four sides ... return air, from all sides at the top. Where ducts are required for distant rooms, permanent connection is made at the bottom. Completely assembled . . . ready to install. Casing height, 88 inches. Security breather tube automatically supplies air for combustion.

Other outstanding INN-A-WALL values are • Quiet, positive blower • Fully automatic • Special Security high-efficiency burners • Complete adaptability to any floor plan (may be placed in wall or stand alone) • Amazingly economical in price.

SECURITY

Automatic, Gas-Fired

INN-A-WALL FURNACE

Write Today . . .
don't delay. Get all the facts
about this revolutionary new furnace.

SECURITY MANUFACTURING CO.

1630 Oakland St.

Kansas City 3, Mo.



No other furnace cement is like THARCO . . . none can be, since THARCO is the product of a secret Armstrong formula.

So uniformly excellent is this cement that leading furnace manufacturers have used it year after year ... and our steady

customers among contractors run into many hundreds.

NO SHRINKING, cracking or checking-positive guarantee of gas-tight furnaces.

lumps, no wastage.

Look Here!

SMOOTH AS SILK - can

be applied FASTER - no

STAYS PUT-greater adhesion to metal parts due to secret Armstrong formula.

LASTS LONGER - permanent bond not affected by time or high temperatures.

Yet THARCO costs no more than average quality. So wby don't you try it? TRY IT for jobs installed in less time, for jobs that last in perfect condition much longer.

HANDY . . . Ready to Use

THARCO Asbestos Furnace Cement is conveniently packed in metal containers - sizes to meet every requirementfrom 1-lb. cans to 350-lb. drums. Your jobber can supply you, or write today to nearest Armstrong plant for complete information.



larger than the output of the first half of 1948.

In the half-year steelmaking furnaces were operated at an average of 96.3 per cent of capacity, against 92.0 per cent of capacity in the first half of 1948.

Production of the second quarter of 1949 totaled 21,876,330 tons. Steelmaking furnaces were operated at an average of 91.2 per cent of capacity during the second quarter, against 101.5 per cent during the first quarter of 1949.

John E. Sheeban

It is with regret that we report the sudden death of John E. Sheehan of Nutley, New Jersey. Mr. Sheehan had been long associated with the heating industry and at the time of his death was employed as the sales representative in northern New Jersey for the Thatcher Furnace Company of Garwood, New Jersey.

Mr. Sheehan was interested in civic affairs and particularly active in church activities. He was a member of the Ushers Society and Holy Name Society of St. Mary's Church for over thirteen years. He is survived by his wife and a son, John Jr.

Ralph Hooke

The news of the death on June 8th of Ralph Hooke, middle west regional manager for the Timken Silent Automatic Division, Jackson, Michigan, was received with deep sorrow by his many friends in the automatic heating field.

Mr. Hooke, who was 53 years old, died in an Evanston, Illinois, hospital after a short illness. He is survived by his wife, Hazel Hooke, of 2250 Hampton Parkway, Evanston.

Joining Timken Silent Automatic as a district sales manager in 1931, Mr. Hooke become middle west regional manager in 1937.

Ductwork Standard Practice Manual

RECOMMENDATIONS FOR STOCKING SPECIFIED standard types and sizes of prefabricated pipes, ducts, and fittings for warm air heating and air conditioning are contained in a new booklet issued by the Department of Commerce. Known as Simplified Practice Recommendation R207-49, it became effective April 15, 1949. A voluntary project initiated by the industry it replaces the standards in effect since 1945.

Included in the recommendations are furnace pipe and fittings for gravity systems; ducts and fittings for forced air heating and air conditioning and takeoff fitting for extended plenum systems. Many manufacturers, distributors and installers of this equipment have already accepted this recommendation.

Aluminum Shipments Decline

SHIPMENT OF ALUMINUM wrought products further declined in May to 89 million pounds, 16 per cent below the 106 million pounds shipped in April and 33 per cent under the 133 million pounds shipped in May 1948, according to the Bureau of the Census, Department of Commerce. Actually, aluminum shipments reached the lowest point in 3 years. This decline in shipments was mostly due to the decline in plate, sheet and strip which dropped from 73 million pounds in April to 57 million pounds in May.



Square Cased Steel Furnace



Oil-Fired Winter r-Conditioning Unit



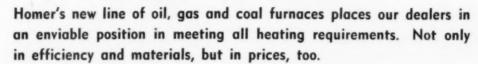




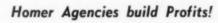
Blower Package Unit



Extra Profits WITH HOMER



Our fine new line gives the dealer a wide variance in sizes: running from 75,000 to 400,000 BTU's; and in addition to furnaces. Homer can supply other kindred heating equipment . . . such as blowers, conversion oil burners, filters; controls, repairs, etc.



We invite inquiries from responsible manufacturers' representatives.

COLDWATER, MICHIGAN

What's home without a Homer Homer Furnace & Foundry Corp.



Oil-Fired Winter Air-Conditioning Unit

Gas-Fired Winter Air-Conditioning Unit

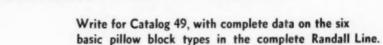
ake sure you don't risk

bearing failure. . . standardize on

Low cost: Sintered Bushing Pillow Block

self-lubricating. self-aligning, economical

Randall Pillow Blocks



RANDALL GRAPHITE BEARINGS, INC.

609 West Lake Street, Dept. 811, Chicago 6, Illinois



NWAH&ACA Convention

(From page 116)

tioned whether the message of warm air heating had been strongly enough presented to builders and home owners and added that people now wished to be sold on quality and economy of operation and maintenance. He stated that the manufacturers should consider a complete re-study of advertising copy so that advertisements may be more informative and factual. with less in the way of unqualified claims. He added that more sales are made by satisfied home owners than by any other means. The speaker then explained that the average home owner knows very little about his heating system and since it is one of his most important items of home equipment, he should be given a manual somewhat like that which accompanies a new car so he may readily understand its operation.

Put on a Price Tag!

R. Louis Towne, New York, presented a stimulating sales address featuring the sale of packaged heating units. He emphasized the necessity of returning to the fundamentals of selling and service. He pointed out that when business gets down to real selling, it is not going to like it for a while and will very likely feel like a "fish out of water." Mr. Towne suggested that in retail displays the heating unit should have the price tag attached so the prospective customer

can qualify himself as a customer. He also stated that "it doesn't make any difference what an industry thinks, what does matter is what the public thinks, wants, and needs, because that is what it will get." The speaker also featured the selling of quantity, because in this way it is possible to get quality and be able to sell at a competitive price. In the matter of selling, Mr. Towne expressed his belief that the industry had an ideal theme in CAC and emphasized that it was the greatest thing that ever happened for the industry to assist in the promotion of warm air heating.

At the Wednesday noon luncheon the guest speaker, Dr. Edward McFaul, teacher and public relations counsel, held his audience's attention with a talk entitled "With Your Hat in Hand." Dr. McFaul pointed out the value of courtesy and etiquette in every phase of business conduct. He emphasized that courtesy in business dealings should be seriously considered in today's sales training.

Announcement was made at the luncheon session of the honorary degree in engineering conferred upon Guy A. Voorhees by Michigan State College at its commencement exercises on June 5. This degree was conferred upon Mr. Voorhees in recognition of his vast knowledge of warm air heating and his ability to teach others through the *Indoor Comfort* Conferences sponsored by the association.

H. F. Randolph, Utica, New York, was elected to fill the unexpired term of E. H. Paul, resigned, on the Board of Trustees.

THE New IMPROVED MODEL C-600

CRISE HEAT CONTROL
FOR ALL HAND-FIRED
HEATING PLANTS

PRICED FOR PROFITS PRICED TO SELL!

The new, improved Model C-600 Crise automatic damper control has been priced to save money for the buyer and to make money for you. In addition to being the biggest dollar value, it's feature packed to make your selling easier. There's new sales appealing beauty in the thermostat, a new, positive adjustment dial on the hi-limit control, a new ball bearing motor plus a host of other details that really sell these controls. Now's the time to get on the Crise bandwagon and make big profits.

Write for literature and name of nearest jobber.

CRISE MANUFACTURING CO. COLUMBUS 16, OHIO



You get the complete package ...
INCLUDING LIMIT SWITCH AND SPRING RETURN

One small package contains everything needed for installation: motor, thermostat, "Surf-a-Stat" (hi-limit control), thermostat wire, sprocket chain, furnace chain, return spring, wiring, pulley, S-hooks, screws, mounting felts.

JOHN ZINK **CONVERSION BURNERS** Available In Two Models



LUMINOUS FLAME MODEL

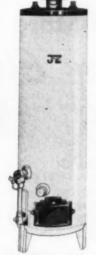
Easy to install. Operates man-ually or automatically. Burns clean fuel—natural, mixed, manu-factured or LP gases — without soot or smoke. Luminous flame radiates heat two to three times faster than a blue flame. Four sizes available for either vertical or horizontal firing.

BLUE FLAME MODEL

Designed to meet the requirements of this type of burner. Capacity range of 100,000 to 200,000 Btu/hr. for operation on natural, mixed or manufactured gases. Manual or automatic operation. Easy to install.

The Amazing New AUTOMATIC WATER HEATER

Another New John Zink Quality Product



SIZES, RATINGS, RECOVERY CAPACITIES

For	Natur	ral, Mfd. and	Liquefied Petrol	eum Gases
No.	Cap. Gal.		Recovery Gal. per Hr.	Crated Weight
X-20 X-30	20 30	20,000 23,000	28.0 32.1	150 190

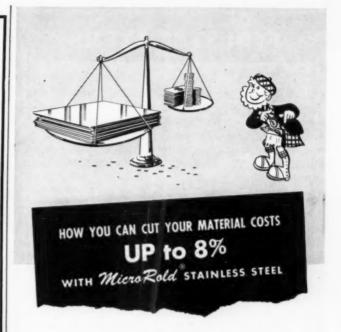
Recovery capacities based on 60° temperature rise.

Write for Literature

John Zink Company

4401 SOUTH PEORIA TULSA, OKLAHOMA

New York - Salt Lake City - Houston - Los Angeles



In the past it has been customary to order stainless steel sheets by gauge number. The permissible A.I.S.I. variation in thickness is approximately plus or minus 10%. Why accept .052 gauge when .047 gauge would suffice?

Using a standard 18 gauge 36 x 120" sheet as an example, the theoretical weight is 63 pounds, but this weight could permissibly vary between 65.52 pounds and 59.22 pounds.

Now you can order MicroRold stainless steel sheets to a decimal thickness plus or minus 3%.

A sheet of MicroRold .0475 thick would weigh 59.85 pounds thus insuring a saving of 3.15 pounds (5%) from the theoretical weight, or 5.67 pounds (8%) from the maximum, while still remaining within the 18 gauge range.

Weight of One Sheet of 18 Gauge 0.051"—64.26 Pounds 0.050"—63.00 Pounds 0.049"—61.74 Pounds 0.048"—60.48 Pounds 0.047"—59.22 Pounds

.052"-65.52 Pounds

Weight of One Sheet of MicroRold .0475 36 x 120, Plus or Minus 3%

.0475"-59.85 Pounds Theoretical Weight 59.85 Pounds

Average saving in theoretical weight 3.15 Pounds per sheet -or 5%.

Remember, this saving is expressed in pounds per single sheet. Multiply your saving by the number of sheets you use per month and the price per pound. You'll have a strong dollars and cents reason for specifying MicroRold stainless steel every time.

WASHINGTON STEEL CORPORATION WASHINGTON, PENNSYLVANIA

INDUSTRY ITEMS

GABE MARIN, president of Sun-Ray Burner Mfg. Corp., Jamaica, New York, has announced the appointment of Bonded Equipment Corp., 323 Centre St., Boston, Massachusetts, as manufacturers representative for the Sun-Ray oil burner line in the metropolitan Boston area. The company is managed by Al Levitt and Jerry Sherr.

BEN B. Breslow, president, Utility Appliance Corp., Los Angeles, Calif., has announced the appointment of Herbert S. Leo as director of sales for the Heating Appliances Division of the company. For the past seven years Mr. Leo has held the post of chief engineer.

He steps into a newly-created position in assuming direction of sales of Utility's forced air furnaces, wall heaters, unit heaters, and all-year conditioners. "The post was created," states Mr. Breslow, "to provide sales department service especially in the interest of our heating appliance dealers." The company also manufactures evaporative air coolers, blowers, and gas ranges.

Richard J. Peterson has been appointed to succeed Mr. Leo as chief engineer. Mr. Peterson has been research and development supervisor for Utility Appliance Corp. since 1940. CARL SAHLER, president of Thatcher Furnace Company, has just announced the appointment of W. Raymond Mook, Jr., to the engineering staff of the company.

Mr. Mook, a graduate of Stevens Institute of Technology, has spent the major portion of his career in the research, design, development and sales of heating equipment. During the war, he served with the Petroleum Administration for War, as Chief of District No. 3 in Texas. Prior to joining Thatcher, he was manager of the Roosevelt Oil Service Corporation.







E. M. Smith

E. M. SMITH has become sales manager of the Sundstrand Engineering Company, Rockford, Illinois, according to a recent announcement by R. H. Gustafson, president and general manager of the company. Mr. Smith took charge of his new post on July 1.

You'll Sell Your Customers More When You

Sell Them Clipper

Not only do Clipper automatic gas-fired furnaces with the Multi-Stream Heat Exchanger offer efficient economical heating, but also modern air conditioning for the greatest living comfort.

COMPLETE RANGE OF SIZES. Clipper furnaces are built in a range of sizes from 80,000 to 200,000 BTU.

COMPETITIVE PRICES. Despite their fine engineering, heavy gauge metals, highly improved controls and other features, Clipper gasfired furnaces are priced in competition with ordinary furnaces.

IMMEDIATE SHIPMENT. Due to the size of the Henderson plant, equipped with the most modern machinery and to the fact that the plant is located in one of California's most productive climates where steady home-awning mechanics are available, we are able to give you immediate shipment of any model.



Compact, with baked enamel finish, the Clipper is attractive for installation anywhere. Clipper units are easily installed even in a small closet. All Clipper furnaces, regardless of size, are shipped to you completely assembled, completely wired and individually tested at the factory.



Here is a typical Clipper air-conditioning furnace with front panels removed to show easy accessibility of controls, blower and burner equipment. You'll find the Clipper Enables You to Sell More—For complete information on Clipper gas-fired units and also an the details of a profitable sales representation plan, fill out and mail this coupon.

HENDERSON FURNACE AND MFG. CO.

SEBASTOPOL, CALIFORNIA

Henderson Furnace and Manufacturing Co. Sebastopol, California

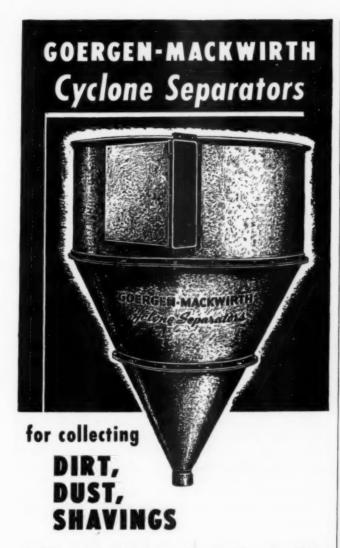
I am interested in the sales opportunities of Clipper furnaces. Please send me complete information.

Name

Address_

City

71014

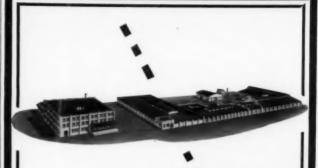


• If dirt, dust, shavings or other useless or harmful particles are created in your manufacturing process, a Goergen-Mackwirth Cyclone Separator will remove and segregate them efficiently and economically. The complete range of sizes available in Cyclone Separators makes it easy to select the exact size for your requirements. Special types and sizes can be designed for individual needs.

Goergen-Mackwirth Cyclone Separators require less horsepower for the fan operation because their offset outlet and clockwise rotation within the collector body greatly reduce the resistance loss through the collector. Their design eliminates the back-pressure found in ordinary separators.

Ask to have one of our engineers survey your problem and submit recommendations. Or write telling us what you want to do and we will quote on the separator needed to do the job.





HOW You Can Get DELIVERY Quicker than usual

SIMPLY call OHIO VALLEY when ordering your Warm Air Heating and Air Conditioning fittings!

Day after day, rain or shine, our company-owned fleet of trucks speeds deliveries to distributors. There's no waiting for merchandise when you order fittings of recognized quality from Ohio Valley.

More Than 400 Ohio Valley Pipes, Ducts and Fittings for You

To save time, to keep your inventory small, select all the items you need from this established line. It's your best assurance of the lowest cost, the speediest service and the quickest turnover line.

FREE ILLUSTRATED PRICE CATALOG

available on request together with name of your nearest distributor. Write today.

Available Through Leading Wholesalers



Metal Manufacturing Division of

OHIO VALLEY

HARDWARE & ROOFING COMPANY

Evansville 2, Indiana

make National Lock your "I-Source" hardware supplier



Over 150 heating contractors, plumbers and sheet metal men were present at a dealer meeting conducted in the Laclede Auditorium, St. Louis, by the L. J. Mueller Furnace Company of Milwaukee. Attending from the Mueller factory were H. P. Mueller, president; F. J. Nunlist, chief engineer; R. W. Weekes and John H. Reock, assistants to general sales manager.



Mueller meeting in St. Louis.

The purpose of the meeting was to bring all St. Louis customers up to date on the complete Mueller Climatrol line of heating and air conditioning equipment. Particular attention was directed to gas equipment in view of the recent release of natural gas for heating in the St. Louis area.

D. F. Fagin, assistant sales manager for the Laclede Gas Company, opened the meeting and welcomed the attending dealers and visiting Mueller factory personnel.

Jan-Air, Incorporated, of Richmond, Illinois, has recently purchased the blower wheel division from the Janette Manufacturing Company of Chicago, Illinois. It is now manufacturing multivane blower wheels in sizes from 5 in. to 12 in. in diameter and in width from 1 in. to 6 in. Various other types of blower wheels have been developed for industrial uses. The company is specializing in blowers for the oil burner, coal stoker, air conditioning, and in industrial cooling varieties.

John I. Janette, formerly vice-president and plant manager of the Janette Manufacturing Company, is president of this new organization.

Perfex Corporation, Milwaukee, Wisconsin, has announced the appointment of thirteen new distributors for their automatic heating controls as a continuation of their distributor franchising program.

New distributors in the West are the R. M. Brand Company, Tucson, Arizona and Albuquerque, New Mexico, covering those two states and part of Texas; Leekley-Hergenrather & Assoc., Los Angeles, California, handling southern California; and R. A. Parker Company, San Francisco, covering northern California and Nevada.

Middle Western appointments include the Thermatic Corporation, Chicago, Illinois, handling northern counties of Illinois and Indiana; the Regulator Controls

announcing! THE REMARKABLE NEW STREAMLINED

1949 NATIONAL AUTOMAT



GAS CONVERSION BURNER

FEATURING many outstanding improvements over the popular 1947 "AGA Certified" National Automat.

FOR SAFETY, EFFICIENCY AND ECONOMY OF OPERATION SEE THE NEW 1949 NA-TIONAL AUTOMAT. FULLY GUARANTEED, TESTED BY LEADING GAS COMPANIES.

Manufacturers Representatives, Jobbers and Dealers, write or call us for information.

Then compare—The Finest Burner at the Lowest Price.

DEALER PRICE

Complete with All Controls—F.O.B. Factory

National Eng. & Mfg. Co.

519 Wyandotte

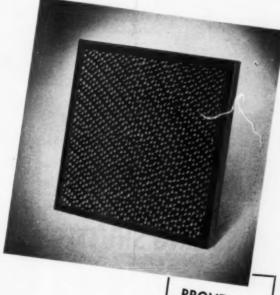
Kansas City, Mo.

Sell the DETROIT air filter

with WICK-ACTION

TO SECURE SATISFIED CUSTOMERS

With "Wick-Action" the passageways through the filter are kept open, therefore more air is allowed to flow through the filter which gives more efficient operation of any air conditioning unit.



PROVE IT! · · · test a WICK-ACTION filter yourself

Write today for literature

DETROIT AIR FILTER CO., INC. Woodstock, Illinois

· BLOWERS ·

for
Air Conditioning Furnace Manufacturers



The New Bishop & Babcock
Air Conditioning
Blower Assembly
Type "AC"—Design 2

The New Bishop & Babcock
Blower Wheel
For Air Conditioning
Furnace Blowers





The New Bishop & Babcock
All Stamped
Housing Assembly
and Component Parts

Write for Bulletin No. 115

MASSACHUSETTS BLOWER DIVISION

The BISHOP & BABCOCK Mfg. Co.

4901 HAMILTON AVENUE

CLEVELAND 14, OHIO



Company, Indianapolis, Indiana, covering the southern two-thirds of Indiana; the Charles D. Jones Company, Kansas City, Missouri, for Kansas and the western half of Missouri; the Prawl Engineering Corp., Omaha, Nebraska, handling the western part of Iowa and the state of Nebraska; and the Ohio Pump Service Company of Cleveland, Ohio, to handle the northeastern Ohio territory.

In the East, Perfex has appointed Harco Distributors, Inc., of Baltimore, Maryland, to handle western Maryland and the northern tip of Virginia; the Patterson Service Sales Company, New York City to handle the New York metropolitan traders area. Southern New Jersey, Delaware, the eastern shore of Maryland and southeastern Pennsylvania will be covered by the Thermotrol Corporation, Philadelphia. The eastern half of Connecticut and balance of New England are under the C. B. Soper Company of Boston, Massachusetts.

In the South, the Chet Adams Company of Greensboro, North Carolina, will handle North and South Carolina and most of Virginia.

THE APPOINTMENT OF GEORGE M. FRAZER as market analyst for the Janitrol space heating equipment division of Surface Combustion Toledo, Ohio, Corporation, was announced by William J. Grover, marketing director. Mr. Frazer is conducting market survey on domestic and commercial space heating equipment in various strategic cities throughout the country.

Previously associated with the Lennox Furnace Company, Marshalltown, Iowa, as market research director, Mr. Frazer has been active in the building and heating fields for a number of years. Mr. Frazer will operate from the Toledo headquarters of Surface Combustion Corporation.



George M. Frazer



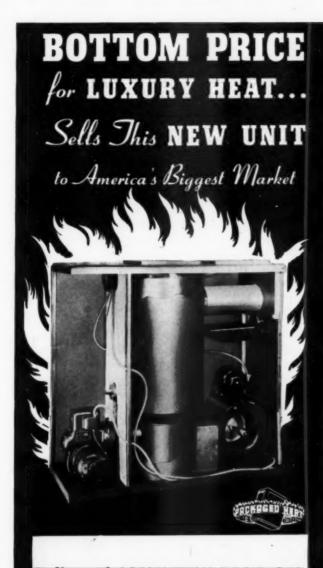
H D Cook

H. Dale Cook has been named manager of the Industrial Control Sales Division of the Perfex Corporation, Milwaukee manufacturers of automatic heating controls. Mr. Cook succeeds A. B. Meeg who recently left Perfex to join Bell & Gossett.

In his new position, Mr. Cook will handle organization and activation of the Perfex program for sales and distribution of industrial controls and instruments.

Before joining Perfex in 1944, he was associated with the General Controls Company, the R. L. Deppmann Company and, prior to 1937, with the Minneapolis-Honeywell Regulator Company.

WARM AIR HEATING SUPPLY Co. and Newville Heating Supply, Inc., Detroit, Michigan, announce the merging



Delivered COMPLETELY PACKAGED

Sell luxury heat at a price within reach of America's biggest market . . . families building and renovating homes priced under \$10,000 . . . but don't cut your fair profit. Penn has done the profit of the factory. but don't cut your fair profit. Penn has done the profit cutting at the factory . . . paring its own margin because it anticipates big volume on its new Packaged Air Conditioner Furnace.

However . . . timely though it is . . . price is far from the whole story on this new unit. Here are just 3 of the other big features:

1. Delivered completely assembled in the jacket—with all wiring done at factory.

2. Stainless steel construction gives smart, modern appearance . . . extra long life.

3. Compact size—length 49" x height 50" x width 21½" — permits two men to carry it through an ordinary doorway.

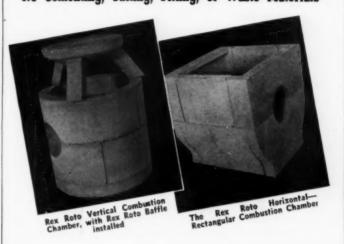
RIGHT NOW is the time to offer a price con-

RIGHT NOW is the time to offer a price conscious market this "little giant" among heating units. Production is limited—so don't delay writing for franchise and engineering information.

PENN BOILER AND BURNER MANUFACTURING CORP. LANCASTER, PA.

REX RoTo

COMBUSTION CHAMBERS ARE OUICKLY and EASILY INSTALLED No Cementing, Cutting, Fitting, or Waste Materials



OUICK SURFACE TEMPERATURE

in any style furnace, with any make burner



REX CLAY PRODUCTS CO.

14414 Dexter Boulevard

Detroit 6, Mich.

of their facilities in the interest of a more complete service to their customers.

For the present both companies will retain their identity as well as their address. The main office and warehouse will be located at 7630 Greenfield Rd., while the warehouse at 409 N. Main St., Royal Oak, Michigan, will serve as a pickup station for the convenience of the trade in that locality. As soon as a satisfactory location can be obtained, a pickup station will be established for east side customers.

JOHN R. LENOX has been named manager of industrial relations and the personnel department of Min-







John R. Lenox Sherwood M. Sitz George B. Benton neapolis-Honeywell Regulator Company, George A. DuToit, Jr., vice president in charge of manufacturing for the company, has announced.

Sherwood M. Sitz, who has been directing industrial relations at the company's Minneapolis factories, has been promoted to director of industrial relations in a consulting capacity for the entire organization, including subsidiary companies, Mr. DuToit said.

George B. Benton, who has been personnel manager, has been transferred to the company's expanded insurance department and will make his headquarters at the home office in Minneapolis.

E. W. SMITH is now director of merchandising of Owens-Corning Fiberglas Corporation. The appointment was announced by Ben S. Wright, vice president and general sales manager. Mr. Smith, who joined the Fiberglas Corporation in April as special assistant to the general sales manager, was formerly vice president for sales of the Philip Carey Manufacturing Company.

Working with Mr. Smith are Tyler S. Rogers, technical editor and manager of Fiberglas Standards publications; Stephen J. Daly, advertising manager of the General Products Division; and Philip Linne, in charge of Fiberglas displays and exhibits.

Edward C. Ames, who has been director of advertising on an interim basis for two years, was named director of public relations and publicity.

Walter Sormane has announced his resignation as general sales manager of the Conco Engineering Works, Mendota, Illinois, with whom he has been associated since 1944. Mr. Sormane is well known in the heating industry in which he has spent nearly twenty years. He was previously sales manager of the Heating Division of Schwitzer-Cummins Co., Indianapolis, the original manufacturer of Stokol stokers.

Mr. Sormane has also devoted a great deal of time and effort in trade association activities working for the betterment of the heating industry. He served

Ġ

COMPETITION IS TOUGHER-

Now is the Time to Get in On a Good Deal!

Brandes offers you a quality product at a price that will get you Volume Business





GH-10-12 100,000 to 120,000 B.T.U. HI-BOY



GH-12-15 120,000 to 150,000 B.T.U. Hi-Boy



G-75-10 75,000-100,000 B.T.U.

WE OFFER

- A QUALITY UNIT
- COMPLETE RANGE OF MODELS AND SIZES FOR THE CONSUMER MASS MARKET

AN EXCEPTIONAL DEAL FOR PROPER DEALERS

Twenty-five years' Heating Experience puts us in a position to know what you want in a product.

We build you a Quality Business.

BRANDES COMPANY-MADISON 4, WISCONSIN



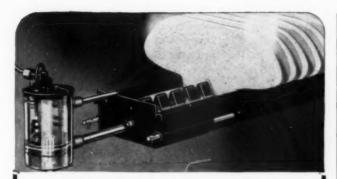
G-10-12 100,000 to 120,000 B.T.U.



G-12-15 120,000 to 150,000 B.T.U.



G-16-20 160,000 to 200,000



There's Profit in Humidifier Sales

Growing sales figures prove that humidifiers are a profitable item for heating dealers. Home owners everywhere are realizing that proper humidity is a necessity—not only for health reasons (avoidance of head colds, etc.) but to save damage on dried-out furnishings. Also, with correct humidity content in the home, the "effective temperature" at which living quarters are comfortable is materially lower than it is without humidity conditioning—resulting in reduced fuel bills.

For permanent customer satisfaction, use Monmouth Flotrol or Micro-Feed models—easy to install, designed on unequalled engineering principles, dependable in operation, low in cost—profitable to sell!

Descriptive bulletin and prices on request.

THE CLEVELAND HUMIDIFIER CO.

7802 Wade Park Ave.

Cleveland 3, Ohio

MONMOUTH HUMIDIFIERS

THE CINCINNATI ELBOW COMPANY

2617 Colerain Ave.

CINCINNATI 14, OHIO





ALL SIZES
ALL ANGLES
ALL GAUGES
ALL METALS

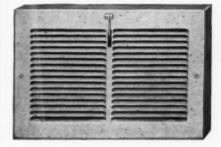




CONDUCTOR PIPE ELBOWS and SHOES

SAVE \$ \$ \$ By Using





For SMALL HOMES & BUILDING PROJECTS

Here's a single valve register with adjustable fins that combines quality and economy. See how you can save on air conditioning and gravity base registers. Ask your supplier or write.

THE A & A REGISTER CO.

8327 Clinton Rd.

Cleveland, Ohio

Geo. G. Auer, Pres.

WHITNEY PUNCHES

No. 4B PUNCH



Length 8½ mehes. Capacity ¼-inch through 16 gauge. Deep Throat — 2 inches. Weight—3 pourds. Punches and Dies—1/16" to 9/32" by 64ths.

No. 6 PUNCH



Length—26½ inches. Capacity — ¾-inch hole through 3/16-inch iron; especially adapted for button punching or templet work. Punches and dies ¼" to 9/32" by 83nds.

No. 91 PUNCH

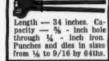


CAPACITY
1/2-inch hole through 1/4-inch hole
through 3/16-inch hron;
2-inch hole through 1/4-inch inch iron. Depth throat,
5 inches. Weight, 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Job

No. 1 PUNCH



No. 2 PUNCH



Length — 23 inches. Capacity — 5/16-inch hole through ¼ - inch iron. Punches and dies in sizes 3/32" to ¼-inch by s4ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two punches Interchangeable, including punches and dies. Capacity—¼inch hole through ¼-inch iron.





PERFORATED METAL

MANY H & K GRILLES - modern and classic - now featured in imposing architectural successes throughout the world have taken their places as prize winners over the past 66 years. New patterns, to meet current trends, are constantly being added to this largest selection of Perforated Grilles patterns that will serve both ornanentally and functionally in heating, air conditioning, ventilating and many other applications down through the years.

Stainless Steel, Aluminum, Brass and Branze are some of the sheet materials that go into H & K Grilles. Costs are lower than for other types of enclosures, since H & K production facilities are geared to the economical manufacture of these high quality grilles. Write for complete in formation NOW. No obligation.

Also Remember — H & K Perforated Metals for industrial polications.

inaton & ERFORATING

5649 FILLMORE ST., CHICAGO 44, ILLINOIS 114 LIBERTY STREET. NEW YORK 6, N. Y.



two terms as president of the Stoker Manufacturers Association, in which he is currently a member of the board of directors, and he has actively participated in many of the activities of other heating trade associations.

THE L. J. KRAUSE COMPANY, a recently formed Minneapolis, Minnesota, organization has been selected by the Krueger Sentry Gauge Company, Green Bay, Wisconsin, as its representative in Minnesota, North and South Dakota, eastern Iowa and western Wisconsin

The Krause Company is owned and operated by Lin J. Krause, former market supervisor of the Reigster Division of Minneapolis Honeywell Regulator Company. Krause is well known in heating and related

T. M. GALLAGHER, Hatboro, Pennsylvania, has been appointed by the Armstrong Furnace Company, Columbus, Ohio, as district manager for the eastern Pennsylvania, Delaware, New Jersey, eastern Maryland, District of Columbia and northern Virginia area comprising the Philadelphia District.

He has been active in the warm air heating industry for the last 22 years in engineering and sales capacities.

As district manager he will work with Armstrong warm air heating and oil burner jobbers to aid them with their merchandising and engineering programs.



T. M. Gallagher



Gordon F. Walker

GORDON F. WALKER has been assigned to represent the Milwaukee Gas Specialty Company in the Eastern territory with headquarters at Philadelphia, according to John A. Wolff, sales manager of the company. Mr. Walker's territory includes the states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and North and South Carolina.

Mr. Walker, a mechanical engineer, has several years experience of design and liaison engineering in the machine trades. Following military service in World War II he joined the sales engineering staff at the Milwaukee Gas Specialty Company where he was employed in developmental work until his transfer to the East.

NATIONAL AIR CONDITIONING INCORPORATED, Johnstown, Pennsylvania, has announced the appointment of Eckstein Company, 526 Galveston Ave., Pittsburgh, as a wholesale distributor in western Pennsylvania, Ohio and West Virginia for its triethylene glycol air cleansing unit known as the Teg Conditioner.

Eckstein Company also sells, to the more than 1500



STEEL ANGLE RINGS

Rolled to a true circle-Rolled-Rite Steel Angle Rings go on easily, fit tight-assuring a flush, tight joint-and outlast the sheet metal pipe they join.

Try these money-saving Rolled-Rite Steel Angle Rings on your

next Heating, Ventilating, or Air Conditioning Job and see the

Write or telephone for list of sizes and price sheet.

chicago metal meg co

3733 South Rockwell Avenue

Chicago 32, Illinois



tings are fabricated with extreme care and

delivered to you with a minimum of delay-and when they are "Made-Rite" you know the job will be well done.

We are ready and anxious to deal with you and you'll be pleasantly surprised at the completeness of our line and dependability of our service.

We solicit inquiries on slitting of metal up to 36 inches wide and 14 gauge and lighter.

"Made-Rite" Co., Inc.

10th and Monroe St.

Newport, Ky.

SIMPLIFY YOUR BUYING

You can save TIME by combining your orders for Conductor Pipe, Gutter, and Accessories with your orders for Galvanized Pipe, Fittings, Registers, and Cast Iron Furnace and Boiler Repairs.

ACT NOW! Your ordering will be easier, faster, and more economical when you buy in one large order

from

Iowa's Largest Heating Wholesaler

DES MOINES FURNACE & STOVE REPAIR CO.

Des Moines, Iowa









newest finest -

strongest

beveled edges
fabricated metal
more free air space
solid construction
no loose parts
ultra-strong baked or
oak finish, longer
wear, matches
flooring. Made in
all standard sizes

Floor Registers



Cold Air Faces

- FORCED AIR REGISTERS—Prompt Delivery Standard Sizes
- MIRRO-GLO LINE Bathroom Medicine Cabinets
- PERFORATED METALS FOR EVERY INDUSTRIAL USE
 Write for complete information and price lists

STANDARD STAMPING & PERFORATING CO.

dealers and contractors in this territory, the complete line of heating equipment of The National Radiator Company, of which National Air Conditioning Incorporated is a division.

RAY A. REED has been appointed district salesman for Surface Combustion in the Minneapolis, Minn. territory, specializing on the sales and servicing of Janitrol heating equipment, according to a recent announcement by C. B. Phillips, vice-president in charge of sales.

During the war Mr. Reed was an instructor in a B-17 bomber group, and previously had been employed as an inspector at the Thomas Steel Mill, Warren, Ohio. Since his discharge from the Air Force, Mr. Reed has been engaged in sales work in Minneapolis.





Ray A. Reed

G. Roudanez

STEEL PRODUCTS ENGINEERING COMPANY, Springfield, Ohio, announces the appointment of Georges Roudanez as manager of the Combustioneer Division. Mr. Roudanez will direct all sales activities in the sale and distribution of Combustioneer automatic coal stokers and humidifiers.

He has had over twenty years of experience in the stoker industry, both in the United States and Canada. Recently he was industrial sales manager for Harry Ferguson, Inc., Dearborn, Michigan. Mr. Roudanez comes to Steel Products from Chicago. He is a graduate of Chicago Technical College with a degree in Mechanical Engineering.

Surewarm Homes—

(From page 96)

all of the beams except the center one were false beams and were no problem. The center beam was a steel girder covered by a false framework of boards. This steel girder had replaced the original partition between the two rooms that had been made into one. This girder, extending to the outer wall on one end, formed a duct. This space continued up the outside wall to the attic, from which cold air poured down into the false beam and out into the center of the living room. The boards that made up the beam had warped, leaving crack which did not show from below, but nevertheless were spraying a fine sheet of cold air out of both sides. By pouring a bag of exploded mica down the outside wall from the attic and blocking the air from going into the end of the false beam. I corrected the situation. This was done rather than trying to seal the boards tight, as there would always be the



Send for This Valuable
Collection of Data

"PANEL WARM AIR HEATING"

51 pages—81/2" x 11"—\$1.00

Made of numerous papers published originally in "American Artisan," this booklet includes a simple, down-to-earth explanation of panel heating. What this method of heating can and cannot do in providing indoor comfort is unmistakably pointed out. It describes various types of installations, and explains why some operate satisfactorily and others do not. Many practical suggestions on correct design procedure are also given.

To obtain a copy, send \$1.00 today to the address below.

KEENEY PUBLISHING COMPANY

6 N. Michigan Avenue

Chicago 2, III.

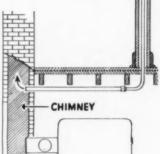
BREATHE-O-STAT

REVOLUTIONARY NEW THERMOSTAT THAT PREVENTS DROOP. ONE SETTING FOR ALL WEATHER



One setting gives comfort in all weather because it eliminates droop. One setting gives economy in all weather because it eliminates costly overshoot. Breathe-O-Stat has all the advantages of heat anticipation and stops the big disadvantage, which is droop.

Now you have something new to offer in a thermostat that automatically compensates for changes in weather conditions. You can guarantee more comfort and guarantee fuel savings that will pay for the original cost in from 3 to 5 years. Easy to sell because the price is low. Extremely simple, no service calls. Customers can adjust themselves with 1 minute instructions from you.





Breathe-O-Stat is a refined two wire low voltage thermostat for mass replacement and new job sales. A really low priced product for the ordinary guy that gives high priced performance at low cost. Alert dealers should contact their jobber or write direct.

BOOSTER FAN

Heat that cold room! Famous Ventilated feature assures maximum life with minimum attention. Fits pipe cires from 8 to 12". Simple to iratsll. Satisfaction guaranteed.

McLARTY SYSTEMS

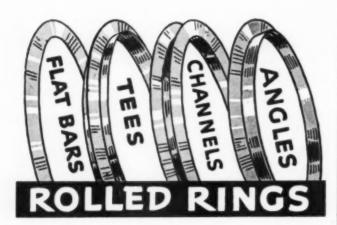
201 W. Michigan Ave. Battle Creek, Mich.





THE PERFORMANCE PLUS of ATH-A-NOR has been proven thousands of times every year for a half century. Be sure of Higher profits—Be sure of complete customer satisfaction — you can with ATH-A-NOR—it gives more—Write or wire for details.

MAY-FIEBEGER COMPANY
Newark Ohio



ANGLE RINGS—Accurately Rolled or Rolled and Punched to Specification or Stock Sizes. Write for Stock Size List, Prices and Discounts. Other Rings Rolled or Rolled and Punched to specification—Channel, Tees, Rods, Flats, Pipe, Tube.

SHEET METAL PRODUCTS FABRICATED TO SPECIFICATION

Shearing 12 ft. ¼ in.—Punching 210 Ton Cap.—Forming 15 ft. ¾ in. Greater thickness in shorter lengths. Assembling—Welding (Arc. Acet. Spot) Riveting Single Units or in Quantity.

NATIONAL METAL FABRICATORS

2138 So. Sawyer Avenue

Chicago 23, Illinois

PROFITS
for YOU—
Cleaning Furnaces
with the
GRAND RAPIDS

with the

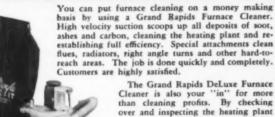
GRAND RAPIDS

De Luxe

FURNACE

CLEANER





Cleaner is also your "in" for more than cleaning profits. By checking over and inspecting the heating plant as you clean it you are in a position to make timely recommendations for new equipment or repairs. This means better service for customers . . . more profits for you.

Write for complete information and prices today.

DOYLE VACUUM CLEANER CO.

227 Stevens St., S.W.

Grand Rapids 7, Michigan

factor of warping due to the cold air getting into the board and causing condensation.

This article has tried to bring to your attention the fact that there can be more than one cause for discomfort in the home. Sometimes we may think that one thing is causing the system not to function and we correct it, with no improvement. We become discouraged by this, when it may take the correction of two or even three defects to show any improvement at all.

Kruckman-

(From page 71)

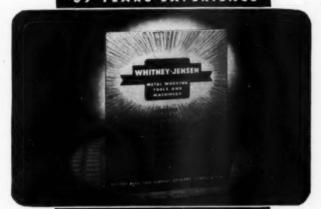
"The farm housing program will be under the administration of the Department of Agriculture. Through the National Housing Council, established as a part of the Housing and Home Finance Agency, means exist for effectively correlating these activities and making them all a part of the coordinated general housing program.

"The housing research made mandatory by the law supplies a fundation for developing a much broader and more far-reaching knowledge of housing, and will enable the agency to conduct surveys of infinitely greater value in a social sense than ever has been possible in the past. I anticipate close cooperation between government and public enterprise. Our plans call for close cooperation through advisory committees representing industry, local government, labor, consumer interests, and other Federal agencies to formulate and carry out details of this striking progressive program."

The ECA is happily giving labor and industry leaders of many European nations a lovely series of joy rides. It brings them over here at the expense of this nation and sends them on a sort of glorious Cook's tour visiting the spots where industries with which they are affiliated are located. For instance a 17-man team came from what we still euphoniously refer to as Great Britain as representatives of its building industry. This 17-man team included architects, contractors, surveyors, and workers. It was the fifth of such groups sponsored by the Anglo-American council on productivity. It cooperated with ECA's Technical Assistants Division. They came from the midlands of England. from Scotland, from London, from Wales, from Newcastle-on-Tyne, and they represented the National Federation of Building Trades Employers as well as the trades unions of the employees. There was even a group from the Federation of Associations of Specialists and Sub-contractors.

While they were here for six weeks they wandered all over the face of the United States, studying our methods of constructing low and medium cost houses, small schools, industrial plants, and commercial office buildings (also the night-clubs) of a size comparable to those they have in the British Isles. They were particularly interested in methods of utilizing building materials other than lumber. They studied methods of design, cost, procedures, and the manner in which owner, architect, engineer, contractor, and laborer cooperated to expedite housing and labor relations, and

WHITNEY METAL

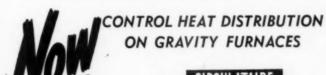


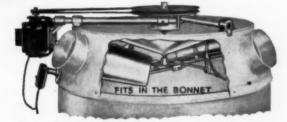
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12890 WESTWOOD AVE. DETROIT 23, MICHIGAN our methods of expediting financing arrangements. A report will be made later summarizing the impressions and opinions of this group which should be very interesting to the readers of this letter. There was a plumber and a heating man in the group.

Another Housing Bill

Senator John Sparkman (D.-Ala.) has introduced a bill designed as a spur to the construction of homes for the middle income group. It would extend Titles I, II, and IV of the FHA law for 12 months; it would provide for \$1 billion in direct loans, housing cooperatives, and other non-profit housing corporations. It would also provide for special loans to veterans and authorize 40 year loans at 2½ per cent interest to educational institutions for building dormitories and housing. Under certain conditions, states, municipalities, and other political subdivisions would be given, without cost, public housing now owned by Uncle Sam.

The bill is intended to make it easier for veterans and others to get bank loans. Under existing conditions banks have become increasingly unwilling to risk loans under the partial guarantee of the FHA. Sparkman's bill would guarantee 95 per cent on loans for homes for the middle income group, and 100 per cent on loans for most types of veterans' construction. For instance, under the bill, the government would insure 95 per cent of a loan for a single dwelling whose cost would not exceed \$6,650. If this amount is exceeded by \$950, as in the case of a three bedroom house, and by \$1,900, as in the case of a four bedroom house, Uncle Sam still would guarantee 95 per cent of the loan. Thus, a person with \$350 cash could get a loan to build a two-bedroom house and pay the rest over 32 years.

Konzo-

(From page 88)

the floor surface temperature obtained at the outer wall will be low in wintertime, if the heat flow can occur readily from the slab floor to the outer wall. In severe climates, the floor surface temperatures can become lower than the dewpoint temperature of the room air, in which case condensation will occur on the floor and possibly in the wood sill plate. Furthermore, poor floor construction results in large heat losses from the floor slab, particularly in the case where heating ducts are installed in the slab. The use of adequate edge insulation is mandatory. See Fig. 4. A 2 in. thickness of edge insulation, of water resistant material, is recommended for those installations in which the heating ducts are located in the slab.

c. Conventional heating systems in which the warm air has been introduced at the high sidewall location have not always resulted in favorable reports from the field, although due to lack of precise test data it is not possible to determine the causes. It is probable that part of the trouble may be due to cold floor surfaces resulting from inadequate edge insulation. Floor panel systems of various types, hot water as well as warm air, have been tried with varying de-

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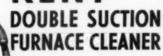
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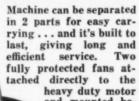
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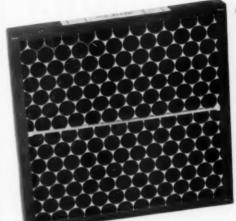
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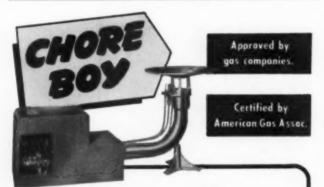
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FOUNDED 1914 667 POST, S., DETROIT 17, MICH. grees of success. See Fig. 5. Some difficulties have been reported with these floor panel systems in connection with the slow response of the system and large fuel consumption. One fact emerges from the limited field tests that have been conducted; that a new approach must be used which will adequately handle the problems of cold floor surfaces at the edge, large heat losses from the floor slab, and slow response to changes in heat demand.

An Opinion of Trends in Heating of Basementless Homes

From a study of the dozens of different approaches now being offered to the solution of this special heating problem, it is apparent that any conclusions submitted are largely a matter of personal opinion. Practice has varied so widely that research has been unable to keep step with the changes; to do so would require the building and testing of at least a dozen structures simultaneously. A large number of field observations have been reported, but the results are so sketchy that only a few generalizations can be made, and those not too positively. Any opinions expressed in this article are, therefore, based upon little confirmatory data.

It appears from our vantage point, where the entire field of heating can be critically surveyed, that the most satisfactory approach consists of a type of warm air heating, in which the warm air is delivered to a trench duct located at the perimeter of the house and in the floor. The air from the furnace enters the perimeter duct and is then permitted to enter the room through either floor registers or baseboard registers or slots. A simplified diagram of such a system is show in Fig. 6. The warm air from the furnace is fed into a main trunk duct leading out towards the perimeter, at which point the air divides and flows in the perimeter branch ducts. The air cools as it flows along the duct because heat is transmitted not only to the ground but also to the floor panel above the perimeter duct. To a small extent the floor surface above the perimeter duct serves as a floor panel. At a number of points along the perimeter duct the air is tapped off into the registers. All of the air leaving the furnace eventually enters the rooms and would be returned to the furnace blower at room air temperature. The return air duct system would be extremely simple and short, since the return air intake would be located at the high sidewall or ceiling near the furnace.

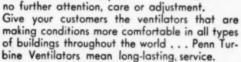
From the meager evidence available from the field, the reports of room air temperatures have been satisfactory. The temperature difference from floor level to breathing level has been small, the floor surfaces were warmed at the outer edges where the greatest troubles were previously noted, and positive air circulation has been introduced into the rooms. In addition, due to the fact that only a small portion of the massive concrete slab is warmed above the room air temperature, no difficulties seem to exist with temperature control or response to rapid changes in heat demand.

Although a large number of systems have been installed on an experimental, cut-and-try basis, no design procedures have been developed to date. Realizing full well that any design procedure at this time is not

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substantiated by experimental evidence, nevertheless the author has been interested in devising a design approach that takes into account most of the variables. This suggested design procedure is to be considered as tentative and subject to later modification. It is hoped that it may lead to some amount of standardization of approach, and perhaps even point the way towards an improvement in the art.

Sun House-

(From page 93)

the two bedrooms, one between the kitchen and bathroom, and the third serves for the big living room. The heat-storing chemical is filled into sealed containers, which are placed in the bins in such a way that the air can flow between the containers. A baffle divides the bin, to conduct the air flow around the cans evenly; Fig. 3 shows the schematic arrangement of the collector, ducts, and bin. Fig. 4 shows the ground plan of the house.

When the metal plate and, through the metal plate, the air behind the plate are heated by the sun, reaching about 100 F, a thermostatically controlled blower in the duct starts to force the warm air from the upper part of the air space through the duct down into the heat-storage bin. The air flows through the air spaces between the cans, making an upward turn at the end of the baffle, and returns through two ducts to the lower part of the collector to pick up more heat. This process continues as long as the temperature of the collector is above 95 F, when the circulating blower is stopped automatically by the thermostat. The temperature of the air circulating from the collector to the bin, and the temperature of the returning air are recorded automatically in the Dover experiment, and from these temperature data the amount of the heat stored and the collection efficiency can be calculated.

The three storage bins of the Dover house contain 700 five gallon containers, filled with the chemical compound. The entire storage space is only about one-twelfth of the total volume of the house, about half the size of an average room.

The heat from the storage bins is transferred to the room partly by radiation and convection through the bin walls. It was obvious that the bins could not be completely insulated, and therefore the heat leakage of the bins is dissipated as radiant heat into the rooms. When more heat is required, a thermostatically controlled blower moves the air from the bin into the rooms through a duct, a return duct being provided for the passage of the room air into the bin.

Great care must be taken to avoid air leakages behind the collector, and therefore the ducts were sealed with additional tape. At night the entire collector is completely shut off from the house by automatic louvers.

The large window areas of the first floor were further protected against heat losses at night by aluminum-painted shades. A double set of such shades was used, one mounted in the usual way in the window frame, and the second placed inside the room overlapping the window casing. This arrangement cuts the heat losses through the glass to a relatively low figure.

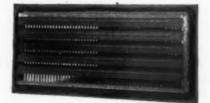
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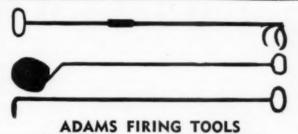
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the heating season. The house was occupied on Christmas Eve. Records have been kept since that time. The winter was milder than usual, and the completion of the test will have to wait till next fall to have a complete test through the entire heating season. There are minor problems and details (shape of containers, blowers, etc.) which have to be studied. More research and development are required to make sun heating available to the public. But the Dover house is the first revolutionary step, with immense possibilities, since it uses an energy which exists in abundance, is unlimited, inexhaustible, unrestricted, and free to everybody.

Piering-

(From page 94)

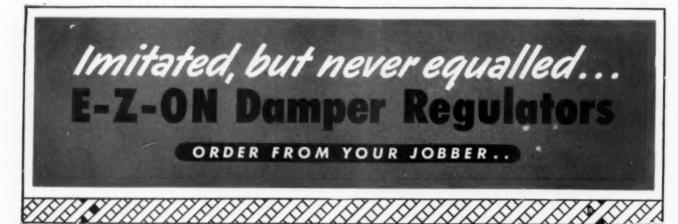
are required each year.

Medical science is working to overcome that major obstacle of cost through the development of new drugs which, when taken in capsule or tablet form, tend to ease the afflictions of the hay-fever victim. Because every such victim cannot migrate to non-infested areas during the hay-fever season, the average sufferer must rely on science to relieve him of as much suffering as possible. During recent years the use of packaged air conditioning units has increased tremendously along with central air conditioning systems. By means of such devices the hay-fever sufferer can spend his time indoors and breathe fresh, pollen- and dirt-free air. The condition of this air is due to the air filter, which

is used in most air conditioning units to filter both dirt and pollen from the air.

Engineers at Research Products Corporation, Madison, Wisconsin, have endeavored to set up a universal test procedure for determining the efficiency of various types of filters in removing pollen from the air. The filter to be tested is placed in a 20 by 20 in. test apparatus. A standard 1 by 3 in. slide is then placed in a horizontal position, after being coated with petroleum jelly, coated side up, approximately 5 in. upstream of the filter. An identical slide is mounted approximately 5 in. downstream of the filter. A small, measured amount of ragweed pollen is fed into the air stream by a dust-feeding device at a constant velocity of 350 fpm for a period of five minutes. After this time interval, the slides are removed and a pollen count on each is made under a microscope having a magnification of 210. The count on each slide is taken as being in the same ratio to the total pollen count of the air going past the slide. As the two slides are identical and exposed under identical conditions, the ratio of these two pollen counts should be the ratio of the relative density of the pollen in the air before and after filtration. To get a representative count on each slide, 20 fields are counted, 10 along each side, with the total pollen count in these fields being used in the calculations as representative of the pollen concentration of the air stream in which it was mounted. For

Total pollen count on upstream side..... 220
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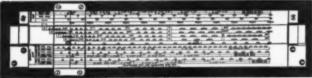
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Zideck-

(From page 110)

joining. The brake and other forming tools, including a small press, are in the rear corner of the ship at 5. A large layout bench faces the engineering office which issues blueprints and instructions. The bench 4 on which preparatory work is done adjoins the shears and slip roll formers. From this point the production lineup differs slightly from the conventional pattern, due to the more involved finishing processes required for this type of equipment.

The operations 6, 7, 8, and 9 are grouped together because the parts must travel back and forth between finishing and assembly. These operations are selfcontained and removed from the activities at 1-A, 3, 4 and 5. In this shop the finishing operations include testing various products for leaks. In this drawing the ship equipment has been pictured scantily as for the most part it follows the general production processes previously outlined.

Either of the two shops shown can be converted to other production, any production which finds it advantageous to display the product to the customer. An architectural or industrial sheet metal shop often displays its products to passers-by to indicate the type of work done. A heating and ventilating shop carries many items which it keeps separate from the shop and can be used for display. Frequently, a small display room is crowded in alongside the front office, but where it is possible to devote more space to display, the arrangements shown produce good results.

The characteristics of the shop and the nature of the product which it makes have a great influence on the operation of any sheet metal business. It is often possible to pick up ideas from the experience of others which can add efficiency to a business operation. The purpose of this series is to present well-arranged shops for the reader to study and adopt any ideas that seem worthwhile.



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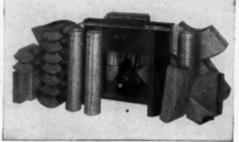
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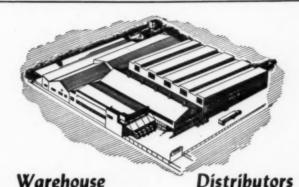
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Carnegie-Illinois Steel Corp. 22 Central-West Machinery Co. Inc. 171 Century Engineering Corp. 121 Certified Furnace Co. 59 Char-Gale Mfg. Co. 59 Chase Brass & Copper Co. 136 Chevrolet Motor Div., General Motors Corp. 6 Chicago Metal Mfg. Co. 155 Cincinnati Elbow Co., The 153 Clarage Fan Co. 8 Clayton & Lambert Mfg. Co. 8 Clayton & Lambert Mfg. Co. 155 Clincinnati Elbow Co. The 153 Clinatemaker Side Rule Service 168 Columbia Steel Co. 153 Climatemaker Side Rule Service 168 Columbia Steel Co. 22 Comfort Equipment Corp. 6 Comfort Equipment Corp. 7 Conco Engineering Works. 62 & 159 Condensation Engineering Corp. 7 Consolidated Industries, Inc. 122 & 123 Corlett-Turner Co. 159 Corolore Heater Corp. 8	Lexington Supply Co. Lima Register Company. 5 Locke Stove Co. 4 Lockformer Co. 4 Lockformer Co. 5 Lonergan Mfg. Co. 5 M-M-A. Inc. 16 Made-Rite Furnace Pipe & Fitting Co. 15 Maid-O'Mist. Inc. 16 Marshalltown Mfg. Co. 16 Marshalltown Mfg. Co. 16 Marshalltown Mfg. Co. 16 May-Fiebeger Co. 15 Mayflower Air Conditioners, Inc. 16 McDonnell & Miller, Inc. 16 McLarty Systems 15 Meyer & Bro. Co., F. 16 Meyer & Bro. Co., F. 16 Miller & Doing. 16 Millon Equipment Co. 16 Minneapolis-Honeywell Regulator Co. 3 Molloy Sales Corp. 16 Morrison Products, Inc. 17 Morrison Steel Products, Inc. 18	Tennessee Coal, Iron & R. R. Co. 22 Thatcher Furnace Co. 24 Thor Metal Prod. Co. * Thor Metal Prod. Co. * Thor Tool & Die Co. * Tjernlund Mfg. Co. 135 Trade Winds Motor Fans, Inc. 155 Triangle Mfg. Co. 140 Turner Brass Works. * Tuttle & Bailey, Inc. * Union Mfg. Co. 161 U. S. Machine Corp. 28 United States Register Co. 134 United States Steel Export Co. 22 Willity Appliance Corp. 21 & 23 Van Packer Corp. 164 Viking Air Conditioning Corp. 45 Ward Machinery Co. 45 Washington Steel Corp. 145 Waterman. Waterbury Co. 82
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Carnegie-Illinois Steel Corp. 22	Lexington Supply Co. Lima Register Company. 5 Locke Stove Co. 4 Lockformer Co. 5 Lonergan Mfg. Co. 6 M-M-A. Inc. 16 Made-Rite Furnace Pipe & Fitting Co. 15 Maid-O'Mist, Inc. 16 Marshalltown Mfg. Co. 16 Marshalltown Mfg. Co. 16 May-Flebeger Co. 16 Meyor & Bro. Co., F. Meyer & Bro. Co., F. Meyer & Bro. Co., F. Meyer Furnace Co. 16 Millor & Doing. 16 Millor & Doing. 16 Millor & Doing. 16 Millor Sales Corp. 16 Minneapolis-Honeywell Regulator Co. 3 Molloy Sales Corp. Morrison Products, Inc. 3 Mt. Vernon Furnace & Mfg. Co. 16 Mueller Furnace Co., L. J. 40 & 4 National Air Conditioning, Inc. 6 National Air Conditioning, Inc. 6 National Air Conditioning, Inc. 6 National Heater Co. 14 National Heater Co. 16 National Heater Co. 16 National Metal Fabricators 15 National Super Service Co. 16 Niagara Machine & Tool Works. 3	Tennessee Coal, Iron & R. R. Co. 22 Thatcher Furnace Co. 24 Thor Metal Prod. Co. * Thor Metal Prod. Co. * Thor Mole Die Co. * Tiernlund Mfg. Co. 135 Trade Winds Motor Fans, Inc. 155 Triangle Mfg. Co. 140 Turner Brass Works. * Tuttle & Bailey, Inc. * Union Mfg. Co. 161 U. S. Machine Corp. 28 United States Register Co. 134 United States Steel Corp. 22 United States Steel Corp. 22 United States Steel Export Co. 22 United States Steel Export Co. 22 United States Steel Supply Co. 22 United States Steel Corp. 21 United States Steel Corp. 21 United States Steel Corp. 21 Whited States Corp. 36 Ward Machinery Co. 4 Washington Steel Corp. 145 Washington Steel Corp. 145 Waterman-Waterbury Co. 82 Weirton Steel Corp. 145 Waterman-Waterbury Co. 82 Weirton Steel Co. 35 Western Engrg. Co. 156 Wheeling Corrugating Co. 11 White-Rodgers Elec. Co. 43 Whitney Mfg. Co. W. A. 153 Whitney Mfg. Co. 159 Wilhelmsen Sheet Metal Works. 170 Willelms Oil-O-Matic Division
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